

# SEQUENCE LISTING

<110> Carozzi, Nadine  
Hargiss, Tracy  
Koziel, Michael G.  
Duck, Nicholas B.  
Carr, Brian

<120> AXMI-006, A Delta-Endotoxin Gene and  
Methods for Its Use

<130> 045600/274146

<150> 60/448,806

<151> 2003-02-20

<160> 15

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 2208

<212> DNA

<213> *Bacillus thuringiensis*

<220>

<221> CDS

<222> (1)...(2208)

<400> 1

|                                                                 |     |
|-----------------------------------------------------------------|-----|
| atg aat caa aat aac gat aat aac gaa tat gaa att att gat tcg cat | 48  |
| Met Asn Gln Asn Asn Asp Asn Asn Glu Tyr Glu Ile Ile Asp Ser His |     |
| 1 5 10 15                                                       |     |
| acc tca cct tat ttt ccg aac aga aac agt aat gat tct aga tac cct | 96  |
| Thr Ser Pro Tyr Phe Pro Asn Arg Asn Ser Asn Asp Ser Arg Tyr Pro |     |
| 20 25 30                                                        |     |
| tac aca aat aat cca aat caa cca tta caa aac aca aat tac aaa gag | 144 |
| Tyr Thr Asn Asn Pro Asn Gln Pro Leu Gln Asn Thr Asn Tyr Lys Glu |     |
| 35 40 45                                                        |     |
| tgg ctc aat atg tgt caa ggg aat aca caa tat ggt gat aat ttc gag | 192 |
| Trp Leu Asn Met Cys Gln Gly Asn Thr Gln Tyr Gly Asp Asn Phe Glu |     |
| 50 55 60                                                        |     |
| aca ttt gct agt gct gat aca att gct gca gtt agt gca ggt act att | 240 |
| Thr Phe Ala Ser Ala Asp Thr Ile Ala Ala Val Ser Ala Gly Thr Ile |     |
| 65 70 75 80                                                     |     |
| gta tcc ggt act ctg tta gcc ggt ata ggt ggg ctc act tct ata tcc | 288 |
| Val Ser Gly Thr Leu Leu Ala Gly Ile Gly Gly Leu Thr Ser Ile Ser |     |
| 85 90 95                                                        |     |

|                                                                 |     |
|-----------------------------------------------------------------|-----|
| gga ccg ata gga ata ata ggt gct ata ata ata tct ttt ggt acc cta | 336 |
| Gly Pro Ile Gly Ile Ile Gly Ala Ile Ile Ile Ser Phe Gly Thr Leu |     |
| 100 105 110                                                     |     |
| atc act gtc ttt tgg ccc gcg gga gaa caa gac aaa aca gta tgg aca | 384 |
| Ile Thr Val Phe Trp Pro Ala Gly Glu Gln Asp Lys Thr Val Trp Thr |     |
| 115 120 125                                                     |     |
| caa ttt att aaa atg gga gaa att ttt gtt gat aca ccg tta aca gaa | 432 |
| Gln Phe Ile Lys Met Gly Glu Ile Phe Val Asp Thr Pro Leu Thr Glu |     |
| 130 135 140                                                     |     |
| agc ata aaa cag cta aag tta caa act tta gaa gga ttt aga caa ata | 480 |
| Ser Ile Lys Gln Leu Lys Leu Gln Thr Leu Glu Gly Phe Arg Gln Ile |     |
| 145 150 155 160                                                 |     |
| tta caa agc tat aat aca gca tta gat gat tgg aga aaa tta aaa aga | 528 |
| Leu Gln Ser Tyr Asn Thr Ala Leu Asp Asp Trp Arg Lys Leu Lys Arg |     |
| 165 170 175                                                     |     |
| cta caa gct cct gga tta cca cca tca tca gca tta caa caa gct gcc | 576 |
| Leu Gln Ala Pro Gly Leu Pro Pro Ser Ser Ala Leu Gln Gln Ala Ala |     |
| 180 185 190                                                     |     |
| ttg act ctt aaa ata cga ttt gag aat gtt cac aat gat ttt att cga | 624 |
| Leu Thr Leu Lys Ile Arg Phe Glu Asn Val His Asn Asp Phe Ile Arg |     |
| 195 200 205                                                     |     |
| gaa ata cct ggt ttc caa ctt gaa act tat aaa acg cta tta cta cct | 672 |
| Glu Ile Pro Gly Phe Gln Leu Glu Thr Tyr Lys Thr Leu Leu Leu Pro |     |
| 210 215 220                                                     |     |
| att tat gcg caa gct gct aat ttt cat tta aat tta tta caa caa ggt | 720 |
| Ile Tyr Ala Gln Ala Ala Asn Phe His Leu Asn Leu Leu Gln Gln Gly |     |
| 225 230 235 240                                                 |     |
| gct gaa ttg gct gat gaa tgg aat gca gat ata cat cct tca caa att | 768 |
| Ala Glu Leu Ala Asp Glu Trp Asn Ala Asp Ile His Pro Ser Gln Ile |     |
| 245 250 255                                                     |     |
| gaa cct aat gct gga aca tca gat gac tat tat aaa ctt tta aaa gaa | 816 |
| Glu Pro Asn Ala Gly Thr Ser Asp Asp Tyr Tyr Lys Leu Leu Lys Glu |     |
| 260 265 270                                                     |     |
| aat ata cct aaa tat agt aac tat tgt gca aat acc tat aga aca gga | 864 |
| Asn Ile Pro Lys Tyr Ser Asn Tyr Cys Ala Asn Thr Tyr Arg Thr Gly |     |
| 275 280 285                                                     |     |
| cta aaa aat ctt aga gac gaa cca aat atg aaa tgg agt ata ttt aat | 912 |
| Leu Lys Asn Leu Arg Asp Glu Pro Asn Met Lys Trp Ser Ile Phe Asn |     |
| 290 295 300                                                     |     |
| gac tat cga aga tat atg acc att act gta tta gat acc atc tct caa | 960 |
| Asp Tyr Arg Arg Tyr Met Thr Ile Thr Val Leu Asp Thr Ile Ser Gln |     |
| 305 310 315 320                                                 |     |

|                                                                 |      |
|-----------------------------------------------------------------|------|
| ttt tct tta tat gat ata aaa aga tat aga gat tca ata gga gga ata | 1008 |
| Phe Ser Leu Tyr Asp Ile Lys Arg Tyr Arg Asp Ser Ile Gly Gly Ile |      |
| 325 330 335                                                     |      |
| gaa gta aaa ggc att aag aat gaa ctc aca aga gaa att tat aca act | 1056 |
| Glu Val Lys Gly Ile Lys Asn Glu Leu Thr Arg Glu Ile Tyr Thr Thr |      |
| 340 345 350                                                     |      |
| gaa ata aat ttt gat cgt ctt cct caa ctt aga gtt caa ccc aat cta | 1104 |
| Glu Ile Asn Phe Asp Arg Leu Pro Gln Leu Arg Val Gln Pro Asn Leu |      |
| 355 360 365                                                     |      |
| gct acg atg gaa tat aat tta aca cgt gca agt ttt aaa tta ttt tca | 1152 |
| Ala Thr Met Glu Tyr Asn Leu Thr Arg Ala Ser Phe Lys Leu Phe Ser |      |
| 370 375 380                                                     |      |
| ttt tta gaa caa ttt att ttt tat aca gaa aat aca aat ttc ggg aat | 1200 |
| Phe Leu Glu Gln Phe Ile Phe Tyr Thr Glu Asn Thr Asn Phe Gly Asn |      |
| 385 390 395 400                                                 |      |
| cgt tta gtt ggt att tct aat cgt gat gca cct act tat agc aat act | 1248 |
| Arg Leu Val Gly Ile Ser Asn Arg Asp Ala Pro Thr Tyr Ser Asn Thr |      |
| 405 410 415                                                     |      |
| ata act gaa act tta tat gga gaa aga aca ggt tca ccc aca aca aaa | 1296 |
| Ile Thr Glu Thr Leu Tyr Gly Glu Arg Thr Gly Ser Pro Thr Thr Lys |      |
| 420 425 430                                                     |      |
| aca ata aga cca ttt gaa tct tat aaa gtt tca att gta act gat aga | 1344 |
| Thr Ile Arg Pro Phe Glu Ser Tyr Lys Val Ser Ile Val Thr Asp Arg |      |
| 435 440 445                                                     |      |
| caa tca cct cct gtt tcc cct att caa cca cac ttt ata att aat caa | 1392 |
| Gln Ser Pro Pro Val Ser Pro Ile Gln Pro His Phe Ile Ile Asn Gln |      |
| 450 455 460                                                     |      |
| att gaa ctt tat tta aat ggc tca tct aac aac aca ctc aaa tat tca | 1440 |
| Ile Glu Leu Tyr Leu Asn Gly Ser Ser Asn Asn Thr Leu Lys Tyr Ser |      |
| 465 470 475 480                                                 |      |
| gca gga ggg tct tta tct aat tat caa aac aca act ttt ttt caa ttt | 1488 |
| Ala Gly Gly Ser Leu Ser Asn Tyr Gln Asn Thr Thr Phe Phe Gln Phe |      |
| 485 490 495                                                     |      |
| cct aga aaa aaa gac tgc aat cta gtt att gat cca ggt tgt tca cca | 1536 |
| Pro Arg Lys Lys Asp Cys Asn Leu Val Ile Asp Pro Gly Cys Ser Pro |      |
| 500 505 510                                                     |      |
| aac ttt aat aac tat agt cat att tta tcc cat ttt tca tta ttt act | 1584 |
| Asn Phe Asn Asn Tyr Ser His Ile Leu Ser His Phe Ser Leu Phe Thr |      |
| 515 520 525                                                     |      |
| tat tcc tat gtg att gga tta cag cta caa ata tta gat aca ggt gta | 1632 |
| Tyr Ser Tyr Val Ile Gly Leu Gln Leu Gln Ile Leu Asp Thr Gly Val |      |
| 530 535 540                                                     |      |
| tta gga tgg aca cac agt agt gtt gat aga tat aat gca ata tca gat | 1680 |

|                                                                 |      |
|-----------------------------------------------------------------|------|
| Leu Gly Trp Thr His Ser Ser Val Asp Arg Tyr Asn Ala Ile Ser Asp |      |
| 545 550 555 560                                                 |      |
| aaa ata att aca atg atc cca gca atc aaa ggt aac aat ctt gat aca | 1728 |
| Lys Ile Ile Thr Met Ile Pro Ala Ile Lys Gly Asn Asn Leu Asp Thr |      |
| 565 570 575                                                     |      |
| aac tct aag gta att gaa gga cct ggt cat aca gga gga aac ttg gtt | 1776 |
| Asn Ser Lys Val Ile Glu Gly Pro Gly His Thr Gly Gly Asn Leu Val |      |
| 580 585 590                                                     |      |
| tat tta caa agt caa ggg cgt tta gaa att aca tgt gaa act cct aat | 1824 |
| Tyr Leu Gln Ser Gln Gly Arg Leu Glu Ile Thr Cys Glu Thr Pro Asn |      |
| 595 600 605                                                     |      |
| tct aca caa tct tat ttc att aga ctt cga tat gct aca aat ggt gct | 1872 |
| Ser Thr Gln Ser Tyr Phe Ile Arg Leu Arg Tyr Ala Thr Asn Gly Ala |      |
| 610 615 620                                                     |      |
| gga aat act ctt cct aat ata tct ctt aca ata cca gga gta ata gga | 1920 |
| Gly Asn Thr Leu Pro Asn Ile Ser Leu Thr Ile Pro Gly Val Ile Gly |      |
| 625 630 635 640                                                 |      |
| ata cca cct caa cga ctc aac aac act ttt tct ggt aca aat tat aat | 1968 |
| Ile Pro Pro Gln Arg Leu Asn Asn Thr Phe Ser Gly Thr Asn Tyr Asn |      |
| 645 650 655                                                     |      |
| aat tta caa tac gga gat ttt ggg tat ttc caa ttt cca agt aca gta | 2016 |
| Asn Leu Gln Tyr Gly Asp Phe Gly Tyr Phe Gln Phe Pro Ser Thr Val |      |
| 660 665 670                                                     |      |
| aca tta cct tta aat cga aac ata cca ttt ata ttt aat cgt gca gat | 2064 |
| Thr Leu Pro Leu Asn Arg Asn Ile Pro Phe Ile Phe Asn Arg Ala Asp |      |
| 675 680 685                                                     |      |
| gta tca aat tca att tta atc att gat aaa att gaa ttt ata cca att | 2112 |
| Val Ser Asn Ser Ile Leu Ile Ile Asp Lys Ile Glu Phe Ile Pro Ile |      |
| 690 695 700                                                     |      |
| act tcc tct atg cac caa aat aga gaa aaa caa aaa tta gaa act atc | 2160 |
| Thr Ser Ser Met His Gln Asn Arg Glu Lys Gln Lys Leu Glu Thr Ile |      |
| 705 710 715 720                                                 |      |
| caa aca aaa ata aat aca ttt ttc aca aat cat aca aaa aca ctt tga | 2208 |
| Gln Thr Lys Ile Asn Thr Phe Phe Thr Asn His Thr Lys Thr Leu *   |      |
| 725 730 735                                                     |      |

<210> 2

<211> 735

<212> PRT

<213> Bacillus thuringiensis

<400> 2

|                                                                 |
|-----------------------------------------------------------------|
| Met Asn Gln Asn Asn Asp Asn Asn Glu Tyr Glu Ile Ile Asp Ser His |
| 1 5 10 15                                                       |

5

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     | 480 |     |
| Ala | Gly | Gly | Ser | Leu | Ser | Asn | Tyr | Gln | Asn | Thr | Thr | Phe | Phe | Gln | Phe |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Pro | Arg | Lys | Lys | Asp | Cys | Asn | Leu | Val | Ile | Asp | Pro | Gly | Cys | Ser | Pro |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Asn | Phe | Asn | Asn | Tyr | Ser | His | Ile | Leu | Ser | His | Phe | Ser | Leu | Phe | Thr |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Tyr | Ser | Tyr | Val | Ile | Gly | Leu | Gln | Leu | Gln | Ile | Leu | Asp | Thr | Gly | Val |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Leu | Gly | Trp | Thr | His | Ser | Ser | Val | Asp | Arg | Tyr | Asn | Ala | Ile | Ser | Asp |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Lys | Ile | Ile | Thr | Met | Ile | Pro | Ala | Ile | Lys | Gly | Asn | Asn | Leu | Asp | Thr |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Asn | Ser | Lys | Val | Ile | Glu | Gly | Pro | Gly | His | Thr | Gly | Gly | Asn | Leu | Val |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Tyr | Leu | Gln | Ser | Gln | Gly | Arg | Leu | Glu | Ile | Thr | Cys | Glu | Thr | Pro | Asn |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Ser | Thr | Gln | Ser | Tyr | Phe | Ile | Arg | Leu | Arg | Tyr | Ala | Thr | Asn | Gly | Ala |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Gly | Asn | Thr | Leu | Pro | Asn | Ile | Ser | Leu | Thr | Ile | Pro | Gly | Val | Ile | Gly |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     | 640 |     |
| Ile | Pro | Pro | Gln | Arg | Leu | Asn | Asn | Thr | Phe | Ser | Gly | Thr | Asn | Tyr | Asn |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Asn | Leu | Gln | Tyr | Gly | Asp | Phe | Gly | Tyr | Phe | Gln | Phe | Pro | Ser | Thr | Val |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Thr | Leu | Pro | Leu | Asn | Arg | Asn | Ile | Pro | Phe | Ile | Phe | Asn | Arg | Ala | Asp |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Val | Ser | Asn | Ser | Ile | Leu | Ile | Ile | Asp | Lys | Ile | Glu | Phe | Ile | Pro | Ile |
|     | 690 |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Thr | Ser | Ser | Met | His | Gln | Asn | Arg | Glu | Lys | Gln | Lys | Leu | Glu | Thr | Ile |
| 705 |     |     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |
| Gln | Thr | Lys | Ile | Asn | Thr | Phe | Phe | Thr | Asn | His | Thr | Lys | Thr | Leu |     |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |

<210> 3

<211> 1176

<212> PRT

<213> Bacillus thuringiensis

<400> 3

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asp | Asn | Asn | Pro | Asn | Ile | Asn | Glu | Cys | Ile | Pro | Tyr | Asn | Cys | Leu |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |
| Ser | Asn | Pro | Glu | Val | Glu | Val | Leu | Gly | Gly | Glu | Arg | Ile | Glu | Thr | Gly |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Tyr | Thr | Pro | Ile | Asp | Ile | Ser | Leu | Ser | Leu | Thr | Gln | Phe | Leu | Leu | Ser |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Glu | Phe | Val | Pro | Gly | Ala | Gly | Phe | Val | Leu | Gly | Leu | Val | Asp | Ile | Ile |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Trp | Gly | Ile | Phe | Gly | Pro | Ser | Gln | Trp | Asp | Ala | Phe | Pro | Val | Gln | Ile |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Glu | Gln | Leu | Ile | Asn | Gln | Arg | Ile | Glu | Glu | Phe | Ala | Arg | Asn | Gln | Ala |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Ile | Ser | Arg | Leu | Glu | Gly | Leu | Ser | Asn | Leu | Tyr | Gln | Ile | Tyr | Ala | Glu |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Ser | Phe | Arg | Glu | Trp | Glu | Ala | Asp | Pro | Thr | Asn | Pro | Ala | Leu | Arg | Glu |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     |     | 125 |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Met | Arg | Ile | Gln | Phe | Asn | Asp | Met | Asn | Ser | Ala | Leu | Thr | Thr | Ala |
| 130 |     |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Ile | Pro | Leu | Leu | Ala | Val | Gln | Asn | Tyr | Gln | Val | Pro | Leu | Leu | Ser | Val |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Tyr | Val | Gln | Ala | Ala | Asn | Leu | His | Leu | Ser | Val | Leu | Arg | Asp | Val | Ser |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Val | Phe | Gly | Gln | Arg | Trp | Gly | Phe | Asp | Ala | Ala | Thr | Ile | Asn | Ser | Arg |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Tyr | Asn | Asp | Leu | Thr | Arg | Leu | Ile | Gly | Asn | Tyr | Thr | Asp | Tyr | Ala | Val |
|     | 195 |     |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Arg | Trp | Tyr | Asn | Thr | Gly | Leu | Glu | Arg | Val | Trp | Gly | Pro | Asp | Ser | Arg |
| 210 |     |     |     |     | 215 |     |     |     |     |     | 220 |     |     |     |     |
| Asp | Trp | Val | Arg | Tyr | Asn | Gln | Phe | Arg | Arg | Glu | Leu | Thr | Leu | Thr | Val |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Leu | Asp | Ile | Val | Ala | Leu | Phe | Ser | Asn | Tyr | Asp | Ser | Arg | Arg | Tyr | Pro |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Ile | Arg | Thr | Val | Ser | Gln | Leu | Thr | Arg | Glu | Ile | Tyr | Thr | Asn | Pro | Val |
|     |     | 260 |     |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Leu | Glu | Asn | Phe | Asp | Gly | Ser | Phe | Arg | Gly | Met | Ala | Gln | Arg | Ile | Glu |
|     | 275 |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Gln | Asn | Ile | Arg | Gln | Pro | His | Leu | Met | Asp | Ile | Leu | Asn | Ser | Ile | Thr |
| 290 |     |     |     |     | 295 |     |     |     |     |     | 300 |     |     |     |     |
| Ile | Tyr | Thr | Asp | Val | His | Arg | Gly | Phe | Asn | Tyr | Trp | Ser | Gly | His | Gln |
| 305 |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |     |
| Ile | Thr | Ala | Ser | Pro | Val | Gly | Phe | Ser | Gly | Pro | Glu | Phe | Ala | Phe | Pro |
|     |     |     | 325 |     |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Leu | Phe | Gly | Asn | Ala | Gly | Asn | Ala | Ala | Pro | Pro | Val | Leu | Val | Ser | Leu |
|     |     | 340 |     |     |     |     | 345 |     |     |     |     |     | 350 |     |     |
| Thr | Gly | Leu | Gly | Ile | Phe | Arg | Thr | Leu | Ser | Ser | Pro | Leu | Tyr | Arg | Arg |
|     | 355 |     |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Ile | Ile | Leu | Gly | Ser | Gly | Pro | Asn | Asn | Gln | Glu | Leu | Phe | Val | Leu | Asp |
| 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |     |
| Gly | Thr | Glu | Phe | Ser | Phe | Ala | Ser | Leu | Thr | Thr | Asn | Leu | Pro | Ser | Thr |
| 385 |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |     |
| Ile | Tyr | Arg | Gln | Arg | Gly | Thr | Val | Asp | Ser | Leu | Asp | Val | Ile | Pro | Pro |
|     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |     |
| Gln | Asp | Asn | Ser | Val | Pro | Pro | Arg | Ala | Gly | Phe | Ser | His | Arg | Leu | Ser |
|     |     | 420 |     |     |     |     | 425 |     |     |     |     |     | 430 |     |     |
| His | Val | Thr | Met | Leu | Ser | Gln | Ala | Ala | Gly | Ala | Val | Tyr | Thr | Leu | Arg |
|     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |     |
| Ala | Pro | Thr | Phe | Ser | Trp | Gln | His | Arg | Ser | Ala | Glu | Phe | Asn | Asn | Ile |
| 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |     |
| Ile | Pro | Ser | Ser | Gln | Ile | Thr | Gln | Ile | Pro | Leu | Thr | Lys | Ser | Thr | Asn |
| 465 |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |     |
| Leu | Gly | Ser | Gly | Thr | Ser | Val | Val | Lys | Gly | Pro | Gly | Phe | Thr | Gly | Gly |
|     |     |     | 485 |     |     |     |     |     | 490 |     |     |     | 495 |     |     |
| Asp | Ile | Leu | Arg | Arg | Thr | Ser | Pro | Gly | Gln | Ile | Ser | Thr | Leu | Arg | Val |
|     |     | 500 |     |     |     |     | 505 |     |     |     |     |     | 510 |     |     |
| Asn | Ile | Thr | Ala | Pro | Leu | Ser | Gln | Arg | Tyr | Arg | Val | Arg | Ile | Arg | Tyr |
|     | 515 |     |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ala | Ser | Thr | Thr | Asn | Leu | Gln | Phe | His | Thr | Ser | Ile | Asp | Gly | Arg | Pro |
| 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |     |
| Ile | Asn | Gln | Gly | Asn | Phe | Ser | Ala | Thr | Met | Ser | Ser | Gly | Ser | Asn | Leu |
| 545 |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |     |
| Gln | Ser | Gly | Ser | Phe | Arg | Thr | Val | Gly | Phe | Thr | Thr | Pro | Phe | Asn | Phe |
|     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |     |
| Ser | Asn | Gly | Ser | Ser | Val | Phe | Thr | Leu | Ser | Ala | His | Val | Phe | Asn | Ser |





Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn Thr Asp Glu Leu  
                                   1045                                  1050                                  1055  
 Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr Pro Asn Asn Thr Val  
                                   1060                                  1065                                  1070  
 Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu Glu Tyr Gly Gly Ala Tyr  
                                   1075                                  1080                                  1085  
 Thr Ser Arg Asn Arg Gly Tyr Asn Glu Ala Pro Ser Val Pro Ala Asp  
                                   1090                                  1095                                  1100  
 Tyr Ala Ser Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg Arg Glu  
                                   1105                                  1110                                  1115                                  1120  
 Asn Pro Cys Glu Phe Asn Arg Gly Tyr Arg Asp Tyr Thr Pro Leu Pro  
                                   1125                                  1130                                  1135  
 Val Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys  
                                   1140                                  1145                                  1150  
 Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser  
                                   1155                                  1160                                  1165  
 Val Glu Leu Leu Leu Met Glu Glu  
                                   1170                                  1175

<210> 4  
 <211> 1178  
 <212> PRT  
 <213> Bacillus thuringiensis

<400> 4  
 Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu  
   1                                  5                                  10                                  15  
 Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
                                   20                                  25                                  30  
 Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
                                   35                                  40                                  45  
 Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
                                   50                                  55                                  60  
 Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
   65                                  70                                  75                                  80  
 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
                                   85                                  90                                  95  
 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
                                   100                                  105                                  110  
 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
                                   115                                  120                                  125  
 Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
                                   130                                  135                                  140  
 Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val  
   145                                  150                                  155                                  160  
 Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser  
                                   165                                  170                                  175  
 Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg  
                                   180                                  185                                  190  
 Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val  
                                   195                                  200                                  205  
 Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg  
                                   210                                  215                                  220  
 Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val  
   225                                  230                                  235                                  240  
 Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Arg | Thr | Val | Ser | Gln | Leu | Thr | Arg | Glu | Ile | Tyr | Thr | Asn | Pro | Val | 245 | 250 | 255 |
|     |     |     | 260 |     |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |     |
| Leu | Glu | Asn | Phe | Asp | Gly | Ser | Phe | Arg | Gly | Ser | Ala | Gln | Gly | Ile | Glu |     |     |     |
|     |     | 275 |     |     |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |     |
| Arg | Ser | Ile | Arg | Ser | Pro | His | Leu | Met | Asp | Ile | Leu | Asn | Ser | Ile | Thr |     |     |     |
|     |     | 290 |     |     |     | 295 |     |     |     |     |     |     |     | 300 |     |     |     |     |
| Ile | Tyr | Thr | Asp | Ala | His | Arg | Gly | Tyr | Tyr | Tyr | Trp | Ser | Gly | His | Gln |     |     |     |
| 305 |     |     |     |     | 310 |     |     |     |     |     |     |     |     | 320 |     |     |     |     |
| Ile | Met | Ala | Ser | Pro | Val | Gly | Phe | Ser | Gly | Pro | Glu | Phe | Thr | Phe | Pro |     |     |     |
|     |     |     |     | 325 |     |     |     |     |     | 330 |     |     |     | 335 |     |     |     |     |
| Leu | Tyr | Gly | Thr | Met | Gly | Asn | Ala | Ala | Pro | Gln | Gln | Arg | Ile | Val | Ala |     |     |     |
|     |     |     | 340 |     |     |     |     |     | 345 |     |     |     |     | 350 |     |     |     |     |
| Gln | Leu | Gly | Gln | Gly | Val | Tyr | Arg | Thr | Leu | Ser | Ser | Thr | Leu | Tyr | Arg |     |     |     |
|     |     | 355 |     |     |     |     |     | 360 |     |     |     |     |     | 365 |     |     |     |     |
| Arg | Pro | Phe | Asn | Ile | Gly | Ile | Asn | Asn | Gln | Gln | Leu | Ser | Val | Leu | Asp |     |     |     |
|     |     | 370 |     |     |     | 375 |     |     |     |     |     |     |     | 380 |     |     |     |     |
| Gly | Thr | Glu | Phe | Ala | Tyr | Gly | Thr | Ser | Ser | Asn | Leu | Pro | Ser | Ala | Val |     |     |     |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     | 400 |     |     |     |     |
| Tyr | Arg | Lys | Ser | Gly | Thr | Val | Asp | Ser | Leu | Asp | Glu | Ile | Pro | Pro | Gln |     |     |     |
|     |     |     |     | 405 |     |     |     |     |     | 410 |     |     |     | 415 |     |     |     |     |
| Asn | Asn | Asn | Val | Pro | Pro | Arg | Gln | Gly | Phe | Ser | His | Arg | Leu | Ser | His |     |     |     |
|     |     |     | 420 |     |     |     |     |     | 425 |     |     |     |     | 430 |     |     |     |     |
| Val | Ser | Met | Phe | Arg | Ser | Gly | Phe | Ser | Asn | Ser | Ser | Val | Ser | Ile | Ile |     |     |     |
|     |     | 435 |     |     |     |     |     | 440 |     |     |     |     |     | 445 |     |     |     |     |
| Arg | Ala | Pro | Met | Phe | Ser | Trp | Ile | His | Arg | Ser | Ala | Glu | Phe | Asn | Asn |     |     |     |
|     |     | 450 |     |     |     | 455 |     |     |     |     |     |     |     | 460 |     |     |     |     |
| Ile | Ile | Ala | Ser | Asp | Ser | Ile | Thr | Gln | Ile | Pro | Ala | Val | Lys | Gly | Asn |     |     |     |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     | 480 |     |     |     |     |
| Phe | Leu | Phe | Asn | Gly | Ser | Val | Ile | Ser | Gly | Pro | Gly | Phe | Thr | Gly | Gly |     |     |     |
|     |     |     |     | 485 |     |     |     |     |     | 490 |     |     |     | 495 |     |     |     |     |
| Asp | Leu | Val | Arg | Leu | Asn | Ser | Ser | Gly | Asn | Asn | Ile | Gln | Asn | Arg | Gly |     |     |     |
|     |     |     | 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |     |     |
| Tyr | Ile | Glu | Val | Pro | Ile | His | Phe | Pro | Ser | Thr | Ser | Thr | Arg | Tyr | Arg |     |     |     |
|     |     | 515 |     |     |     |     |     | 520 |     |     |     |     |     | 525 |     |     |     |     |
| Val | Arg | Val | Arg | Tyr | Ala | Ser | Val | Thr | Pro | Ile | His | Leu | Asn | Val | Asn |     |     |     |
|     |     | 530 |     |     |     | 535 |     |     |     |     |     |     |     | 540 |     |     |     |     |
| Trp | Gly | Asn | Ser | Ser | Ile | Phe | Ser | Asn | Thr | Val | Pro | Ala | Thr | Ala | Thr |     |     |     |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     | 560 |     |     |     |     |
| Ser | Leu | Asp | Asn | Leu | Gln | Ser | Ser | Asp | Phe | Gly | Tyr | Phe | Glu | Ser | Ala |     |     |     |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |     |     |     |
| Asn | Ala | Phe | Thr | Ser | Ser | Leu | Gly | Asn | Ile | Val | Gly | Val | Arg | Asn | Phe |     |     |     |
|     |     |     | 580 |     |     |     |     |     | 585 |     |     |     |     | 590 |     |     |     |     |
| Ser | Gly | Thr | Ala | Gly | Val | Ile | Ile | Asp | Arg | Phe | Glu | Phe | Ile | Pro | Val |     |     |     |
|     |     | 595 |     |     |     |     |     | 600 |     |     |     |     |     | 605 |     |     |     |     |
| Thr | Ala | Thr | Leu | Glu | Ala | Glu | Tyr | Asn | Leu | Glu | Arg | Ala | Gln | Lys | Ala |     |     |     |
|     |     | 610 |     |     |     | 615 |     |     |     |     |     |     |     | 620 |     |     |     |     |
| Val | Asn | Ala | Leu | Phe | Thr | Ser | Thr | Asn | Gln | Leu | Gly | Leu | Lys | Thr | Asn |     |     |     |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     | 640 |     |     |     |     |
| Val | Thr | Asp | Tyr | His | Ile | Asp | Gln | Val | Ser | Asn | Leu | Val | Thr | Tyr | Leu |     |     |     |
|     |     |     |     | 645 |     |     |     |     |     | 650 |     |     |     | 655 |     |     |     |     |
| Ser | Asp | Glu | Phe | Cys | Leu | Asp | Glu | Lys | Arg | Glu | Leu | Ser | Glu | Lys | Val |     |     |     |
|     |     |     | 660 |     |     |     |     |     | 665 |     |     |     |     | 670 |     |     |     |     |
| Lys | His | Ala | Lys | Arg | Leu | Ser | Asp | Glu | Arg | Asn | Leu | Leu | Gln | Asp | Ser |     |     |     |
|     |     | 675 |     |     |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |     |
| Asn | Phe | Lys | Asp | Ile | Asn | Arg | Gln | Pro | Glu | Arg | Gly | Trp | Gly | Gly | Ser |     |     |     |
|     |     | 690 |     |     |     | 695 |     |     |     |     |     |     |     | 700 |     |     |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|------|
| Thr | Gly | Ile | Thr | Ile | Gln | Gly | Gly | Asp | Asp | Val | Phe | Lys | Glu | Asn | Tyr | 705  | 710  | 715 | 720  |
| Val | Thr | Leu | Ser | Gly | Thr | Phe | Asp | Glu | Cys | Tyr | Pro | Thr | Tyr | Leu | Tyr | 725  | 730  | 735 |      |
| Gln | Lys | Ile | Asp | Glu | Ser | Lys | Leu | Lys | Ala | Phe | Thr | Arg | Tyr | Gln | Leu | 740  | 745  | 750 |      |
| Arg | Gly | Tyr | Ile | Glu | Asp | Ser | Gln | Asp | Leu | Glu | Ile | Tyr | Leu | Ile | Arg | 755  | 760  | 765 |      |
| Tyr | Asn | Ala | Lys | His | Glu | Thr | Val | Asn | Val | Pro | Gly | Thr | Gly | Ser | Leu | 770  | 775  | 780 |      |
| Trp | Pro | Leu | Ser | Ala | Gln | Ser | Pro | Ile | Gly | Lys | Cys | Gly | Glu | Pro | Asn | 785  | 790  | 795 | 800  |
| Arg | Cys | Ala | Pro | His | Leu | Glu | Trp | Asn | Pro | Asp | Leu | Asp | Cys | Ser | Cys | 805  | 810  |     | 815  |
| Arg | Asp | Gly | Glu | Lys | Cys | Ala | His | His | Ser | His | His | Phe | Ser | Leu | Asp | 820  | 825  |     | 830  |
| Ile | Asp | Val | Gly | Cys | Thr | Asp | Leu | Asn | Glu | Asp | Leu | Gly | Val | Trp | Val | 835  | 840  |     | 845  |
| Ile | Phe | Lys | Ile | Lys | Thr | Gln | Asp | Gly | His | Ala | Arg | Leu | Gly | Asn | Leu | 850  | 855  |     | 860  |
| Glu | Phe | Leu | Glu | Glu | Lys | Pro | Leu | Val | Gly | Glu | Ala | Leu | Ala | Arg | Val | 865  | 870  |     | 880  |
| Lys | Arg | Ala | Glu | Lys | Lys | Trp | Arg | Asp | Lys | Arg | Glu | Lys | Leu | Glu | Trp | 885  | 890  |     | 895  |
| Glu | Thr | Asn | Ile | Val | Tyr | Lys | Glu | Ala | Lys | Glu | Ser | Val | Asp | Ala | Leu | 900  | 905  |     | 910  |
| Phe | Val | Asn | Ser | Gln | Tyr | Asp | Gln | Leu | Gln | Ala | Asp | Thr | Asn | Ile | Ala | 915  | 920  |     | 925  |
| Met | Ile | His | Ala | Ala | Asp | Lys | Arg | Val | His | Ser | Ile | Arg | Glu | Ala | Tyr | 930  | 935  |     | 940  |
| Leu | Pro | Glu | Leu | Ser | Val | Ile | Pro | Gly | Val | Asn | Ala | Ala | Ile | Phe | Glu | 945  | 950  |     | 960  |
| Glu | Leu | Glu | Gly | Arg | Ile | Phe | Thr | Ala | Phe | Ser | Leu | Tyr | Asp | Ala | Arg | 965  | 970  |     | 975  |
| Asn | Val | Ile | Lys | Asn | Gly | Asp | Phe | Asn | Asn | Gly | Leu | Ser | Cys | Trp | Asn | 980  | 985  |     | 990  |
| Val | Lys | Gly | His | Val | Asp | Val | Glu | Glu | Gln | Asn | Asn | Gln | Arg | Ser | Val | 995  | 1000 |     | 1005 |
| Leu | Val | Val | Pro | Glu | Trp | Glu | Ala | Glu | Val | Ser | Gln | Glu | Val | Arg | Val | 1010 | 1015 |     | 1020 |
| Cys | Pro | Gly | Arg | Gly | Tyr | Ile | Leu | Arg | Val | Thr | Ala | Tyr | Lys | Glu | Gly | 1025 | 1030 |     | 1040 |
| Tyr | Gly | Glu | Gly | Cys | Val | Thr | Ile | His | Glu | Ile | Glu | Asn | Asn | Thr | Asp | 1045 | 1050 |     | 1055 |
| Glu | Leu | Lys | Phe | Ser | Asn | Cys | Val | Glu | Glu | Glu | Ile | Tyr | Pro | Asn | Asn | 1060 | 1065 |     | 1070 |
| Thr | Val | Thr | Cys | Asn | Asp | Tyr | Thr | Val | Asn | Gln | Glu | Glu | Tyr | Gly | Gly | 1075 | 1080 |     | 1085 |
| Ala | Tyr | Thr | Ser | Arg | Asn | Arg | Gly | Tyr | Asn | Glu | Ala | Pro | Ser | Val | Pro | 1090 | 1095 |     | 1100 |
| Ala | Asp | Tyr | Ala | Ser | Val | Tyr | Glu | Glu | Lys | Ser | Tyr | Thr | Asp | Gly | Arg | 1105 | 1110 |     | 1120 |
| Arg | Glu | Asn | Pro | Cys | Glu | Phe | Asn | Arg | Gly | Tyr | Arg | Asp | Tyr | Thr | Pro | 1125 | 1130 |     | 1135 |
| Leu | Pro | Val | Gly | Tyr | Val | Thr | Lys | Glu | Leu | Glu | Tyr | Phe | Pro | Glu | Thr | 1140 | 1145 |     | 1150 |
| Asp | Lys | Val | Trp | Ile | Glu | Ile | Gly | Glu | Thr | Glu | Gly | Thr | Phe | Ile | Val |      |      |     |      |

|                                         |      |      |
|-----------------------------------------|------|------|
| 1155                                    | 1160 | 1165 |
| Asp Ser Val Glu Leu Leu Leu Met Glu Glu |      |      |
| 1170                                    | 1175 |      |

<210> 5  
 <211> 719  
 <212> PRT  
 <213> *Bacillus thuringiensis*

<400> 5  
 Met Lys Leu Lys Asn Gln Asp Lys His Gln Ser Phe Ser Ser Asn Ala  
 1 5 10 15  
 Lys Val Asp Lys Ile Ser Thr Asp Ser Leu Lys Asn Glu Thr Asp Ile  
 20 25 30  
 Glu Leu Gln Asn Ile Asn His Glu Asp Cys Leu Lys Met Ser Glu Tyr  
 35 40 45  
 Glu Asn Val Glu Pro Phe Val Ser Ala Ser Thr Ile Gln Thr Gly Ile  
 50 55 60  
 Gly Ile Ala Gly Lys Ile Leu Gly Thr Leu Gly Val Pro Phe Ala Gly  
 65 70 75 80  
 Gln Val Ala Ser Leu Tyr Ser Phe Ile Leu Gly Glu Leu Trp Pro Lys  
 85 90 95  
 Gly Lys Asn Gln Trp Glu Ile Phe Met Glu His Val Glu Glu Ile Ile  
 100 105 110  
 Asn Gln Lys Ile Ser Thr Tyr Ala Arg Asn Lys Ala Leu Thr Asp Leu  
 115 120 125  
 Lys Gly Leu Gly Asp Ala Leu Ala Val Tyr His Asp Ser Leu Glu Ser  
 130 135 140  
 Trp Val Gly Asn Arg Asn Asn Thr Arg Ala Arg Ser Val Val Lys Ser  
 145 150 155 160  
 Gln Tyr Ile Ala Leu Glu Leu Met Phe Val Gln Lys Leu Pro Ser Phe  
 165 170 175  
 Ala Val Ser Gly Glu Glu Val Pro Leu Leu Pro Ile Tyr Ala Gln Ala  
 180 185 190  
 Ala Asn Leu His Leu Leu Leu Leu Arg Asp Ala Ser Ile Phe Gly Lys  
 195 200 205  
 Glu Trp Gly Leu Ser Ser Ser Glu Ile Ser Thr Phe Tyr Asn Arg Gln  
 210 215 220  
 Val Glu Arg Ala Gly Asp Tyr Ser Asp His Cys Val Lys Trp Tyr Ser  
 225 230 235 240  
 Thr Gly Leu Asn Asn Leu Arg Gly Thr Asn Ala Glu Ser Trp Val Arg  
 245 250 255  
 Tyr Asn Gln Phe Arg Arg Asp Met Thr Leu Met Val Leu Asp Leu Val  
 260 265 270  
 Ala Leu Phe Pro Ser Tyr Asp Thr Gln Met Tyr Pro Ile Lys Thr Thr  
 275 280 285  
 Ala Gln Leu Thr Arg Glu Val Tyr Thr Asp Ala Ile Gly Thr Val His  
 290 295 300  
 Pro His Pro Ser Phe Thr Ser Thr Thr Trp Tyr Asn Asn Asn Ala Pro  
 305 310 315 320  
 Ser Phe Ser Ala Ile Glu Ala Ala Val Val Arg Asn Pro His Leu Leu  
 325 330 335  
 Asp Phe Leu Glu Gln Val Thr Ile Tyr Ser Leu Leu Ser Arg Trp Ser  
 340 345 350  
 Asn Thr Gln Tyr Met Asn Met Trp Gly Gly His Lys Leu Glu Phe Arg  
 355 360 365

Thr Ile Gly Gly Thr Leu Asn Ile Ser Thr Gln Gly Ser Thr Asn Thr  
 370 375 380  
 Ser Ile Asn Pro Val Thr Leu Pro Phe Thr Ser Arg Asp Val Tyr Arg  
 385 390 395 400  
 Thr Glu Ser Leu Ala Gly Leu Asn Leu Phe Leu Thr Gln Pro Val Asn  
 405 410 415  
 Gly Val Pro Arg Val Asp Phe His Trp Lys Phe Val Thr His Pro Ile  
 420 425 430  
 Ala Ser Asp Asn Phe Tyr Tyr Pro Gly Tyr Ala Gly Ile Gly Thr Gln  
 435 440 445  
 Leu Gln Asp Ser Glu Asn Glu Leu Pro Pro Glu Ala Thr Gly Gln Pro  
 450 455 460  
 Asn Tyr Glu Ser Tyr Ser His Arg Leu Ser His Ile Gly Leu Ile Ser  
 465 470 475 480  
 Ala Ser His Val Lys Ala Leu Val Tyr Ser Trp Thr His Arg Ser Ala  
 485 490 495  
 Asp Arg Thr Asn Thr Ile Glu Pro Asn Ser Ile Thr Gln Ile Pro Leu  
 500 505 510  
 Val Lys Ala Phe Asn Leu Ser Ser Gly Ala Ala Val Val Arg Gly Pro  
 515 520 525  
 Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg Thr Asn Thr Gly Thr Phe  
 530 535 540  
 Gly Asp Ile Arg Val Asn Ile Asn Pro Pro Phe Ala Gln Arg Tyr Arg  
 545 550 555 560  
 Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Leu Gln Phe His Thr Ser  
 565 570 575  
 Ile Asn Gly Lys Ala Ile Asn Gln Gly Asn Phe Ser Ala Thr Met Asn  
 580 585 590  
 Arg Gly Glu Asp Leu Asp Tyr Lys Thr Phe Arg Thr Val Gly Phe Thr  
 595 600 605  
 Thr Pro Phe Ser Phe Leu Asp Val Gln Ser Thr Phe Thr Ile Gly Ala  
 610 615 620  
 Trp Asn Phe Ser Ser Gly Asn Glu Val Tyr Ile Asp Arg Ile Glu Phe  
 625 630 635 640  
 Val Pro Val Glu Val Thr Tyr Glu Ala Glu Tyr Asp Phe Glu Lys Ala  
 645 650 655  
 Gln Glu Lys Val Thr Ala Leu Phe Thr Ser Thr Asn Pro Arg Gly Leu  
 660 665 670  
 Lys Thr Asp Val Lys Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val  
 675 680 685  
 Glu Ser Leu Ser Asp Glu Phe Tyr Leu Asp Glu Lys Arg Glu Leu Phe  
 690 695 700  
 Glu Ile Val Lys Tyr Ala Lys Gln Leu His Ile Glu Arg Asn Met  
 705 710 715

<210> 6

<211> 652

<212> PRT

<213> *Bacillus thuringiensis*

<400> 6

Met Ile Arg Lys Gly Gly Arg Lys Met Asn Pro Asn Asn Arg Ser Glu  
 1 5 10 15  
 His Asp Thr Ile Lys Thr Thr Glu Asn Asn Glu Val Pro Thr Asn His  
 20 25 30  
 Val Gln Tyr Pro Leu Ala Glu Thr Pro Asn Pro Thr Leu Glu Asp Leu



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Val | Leu | Thr | Trp | Thr | His | Lys | Ser | Val | Asp | Phe | Phe | Asn | Met | Ile |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Asp | Ser | Lys | Lys | Ile | Thr | Gln | Leu | Pro | Leu | Val | Lys | Ala | Tyr | Lys | Leu |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Gln | Ser | Gly | Ala | Ser | Val | Val | Ala | Gly | Pro | Arg | Phe | Thr | Gly | Gly | Asp |
|     |     | 530 |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Ile | Ile | Gln | Cys | Thr | Glu | Asn | Gly | Ser | Ala | Ala | Thr | Ile | Tyr | Val | Thr |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Pro | Asp | Val | Ser | Tyr | Ser | Gln | Lys | Tyr | Arg | Ala | Arg | Ile | His | Tyr | Ala |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Ser | Thr | Ser | Gln | Ile | Thr | Phe | Thr | Leu | Ser | Leu | Asp | Gly | Ala | Pro | Phe |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Asn | Gln | Tyr | Tyr | Phe | Asp | Lys | Thr | Ile | Asn | Lys | Gly | Asp | Thr | Leu | Thr |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Tyr | Asn | Ser | Phe | Asn | Leu | Ala | Ser | Phe | Ser | Thr | Pro | Phe | Glu | Leu | Ser |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Gly | Asn | Asn | Leu | Gln | Ile | Gly | Val | Thr | Gly | Leu | Ser | Ala | Gly | Asp | Lys |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Val | Tyr | Ile | Asp | Lys | Ile | Glu | Phe | Ile | Pro | Val | Asn |     |     |     |     |
|     |     |     |     | 645 |     |     |     | 650 |     |     |     |     |     |     |     |

<210> 7

<211> 659

<212> PRT

<213> *Bacillus thuringiensis*

<400> 7

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ile | Arg | Met | Gly | Gly | Arg | Lys | Met | Asn | Pro | Asn | Asn | Arg | Ser | Glu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Tyr | Asp | Thr | Ile | Lys | Val | Thr | Pro | Asn | Ser | Glu | Leu | Pro | Thr | Asn | His |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Asn | Gln | Tyr | Pro | Leu | Ala | Asp | Asn | Pro | Asn | Ser | Thr | Leu | Glu | Glu | Leu |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Asn | Tyr | Lys | Glu | Phe | Leu | Arg | Met | Thr | Ala | Asp | Asn | Ser | Thr | Glu | Val |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Leu | Asp | Ser | Ser | Thr | Val | Lys | Asp | Ala | Val | Gly | Thr | Gly | Ile | Ser | Val |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Val | Gly | Gln | Ile | Leu | Gly | Val | Val | Gly | Val | Pro | Phe | Ala | Gly | Ala | Leu |
|     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |     |
| Thr | Ser | Phe | Tyr | Gln | Ser | Phe | Leu | Asn | Ala | Ile | Trp | Pro | Ser | Asp | Ala |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asp | Pro | Trp | Lys | Ala | Phe | Met | Ala | Gln | Val | Glu | Val | Leu | Ile | Asp | Lys |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Lys | Ile | Glu | Glu | Tyr | Ala | Lys | Ser | Lys | Ala | Leu | Ala | Glu | Leu | Gln | Gly |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Leu | Gln | Asn | Asn | Phe | Glu | Asp | Tyr | Val | Asn | Ala | Leu | Asp | Ser | Trp | Lys |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Lys | Ala | Pro | Val | Asn | Leu | Arg | Ser | Arg | Arg | Ser | Gln | Asp | Arg | Ile | Arg |
|     |     |     |     | 165 |     |     |     | 170 |     |     |     |     |     | 175 |     |
| Glu | Leu | Phe | Ser | Gln | Ala | Glu | Ser | His | Phe | Arg | Asn | Ser | Met | Pro | Ser |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Phe | Ala | Val | Ser | Lys | Phe | Glu | Val | Leu | Phe | Leu | Pro | Thr | Tyr | Ala | Gln |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Ala | Ala | Asn | Thr | His | Leu | Leu | Leu | Leu | Lys | Asp | Ala | Gln | Val | Phe | Gly |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Glu | Glu | Trp | Gly | Tyr | Ser | Ser | Glu | Asp | Ile | Ala | Glu | Phe | Tyr | Gln | Arg |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     | 240 |
| Gln | Leu | Lys | Leu | Thr | Gln | Gln | Tyr | Thr | Asp | His | Cys | Val | Asn | Trp |
|     |     |     |     |     | 245 |     |     |     | 250 |     |     |     | 255 |     |
| Asn | Val | Gly | Leu | Asn | Ser | Leu | Arg | Gly | Ser | Thr | Tyr | Asp | Ala | Trp |
|     |     |     |     |     | 260 |     |     |     | 265 |     |     |     | 270 |     |
| Lys | Phe | Asn | Arg | Phe | Arg | Arg | Glu | Met | Thr | Leu | Thr | Val | Leu | Asp |
|     |     |     |     |     | 275 |     |     |     | 280 |     |     |     | 285 |     |
| Ile | Val | Leu | Phe | Pro | Phe | Tyr | Asp | Val | Arg | Leu | Tyr | Ser | Lys | Gly |
|     |     |     |     |     | 290 |     |     |     | 295 |     |     |     | 300 |     |
| Lys | Thr | Glu | Leu | Thr | Arg | Asp | Ile | Phe | Thr | Asp | Pro | Ile | Phe | Thr |
|     |     |     |     |     | 305 |     |     |     | 310 |     |     |     | 315 |     |
| Asn | Ala | Leu | Gln | Glu | Tyr | Gly | Pro | Thr | Phe | Ser | Ser | Ile | Glu | Asn |
|     |     |     |     |     | 325 |     |     |     | 330 |     |     |     | 335 |     |
| Ile | Arg | Lys | Pro | His | Leu | Phe | Asp | Tyr | Leu | Arg | Gly | Ile | Glu | Phe |
|     |     |     |     |     | 340 |     |     |     | 345 |     |     |     | 350 |     |
| Thr | Arg | Leu | Arg | Pro | Gly | Tyr | Ser | Gly | Lys | Asp | Ser | Phe | Asn | Tyr |
|     |     |     |     |     | 355 |     |     |     | 360 |     |     |     | 365 |     |
| Ser | Gly | Asn | Tyr | Val | Glu | Thr | Arg | Pro | Ser | Ile | Gly | Ser | Asn | Asp |
|     |     |     |     |     | 370 |     |     |     | 375 |     |     |     | 380 |     |
| Ile | Thr | Ser | Pro | Phe | Tyr | Gly | Asp | Lys | Ser | Ile | Glu | Pro | Ile | Gln |
|     |     |     |     |     | 385 |     |     |     | 390 |     |     |     | 395 |     |
| Leu | Ser | Phe | Asp | Gly | Gln | Lys | Val | Tyr | Arg | Thr | Ile | Ala | Asn | Thr |
|     |     |     |     |     | 405 |     |     |     | 410 |     |     |     | 415 |     |
| Ile | Ala | Ala | Phe | Pro | Asp | Gly | Lys | Ile | Tyr | Phe | Gly | Val | Thr | Lys |
|     |     |     |     |     | 420 |     |     |     | 425 |     |     |     | 430 |     |
| Asp | Phe | Ser | Gln | Tyr | Asp | Asp | Gln | Lys | Asn | Glu | Thr | Ser | Thr | Gln |
|     |     |     |     |     | 435 |     |     |     | 440 |     |     |     | 445 |     |
| Tyr | Asp | Ser | Lys | Arg | Tyr | Asn | Gly | Tyr | Leu | Gly | Ala | Gln | Asp | Ser |
|     |     |     |     |     | 450 |     |     |     | 455 |     |     |     | 460 |     |
| Asp | Gln | Leu | Pro | Pro | Glu | Thr | Thr | Asp | Glu | Pro | Leu | Glu | Lys | Ala |
|     |     |     |     |     | 465 |     |     |     | 470 |     |     |     | 475 |     |
| Ser | His | Gln | Leu | Asn | Tyr | Ala | Glu | Cys | Phe | Leu | Met | Gln | Asp | Arg |
|     |     |     |     |     | 485 |     |     |     | 490 |     |     |     | 495 |     |
| Gly | Thr | Ile | Pro | Phe | Phe | Thr | Trp | Thr | His | Arg | Ser | Val | Asp | Phe |
|     |     |     |     |     | 500 |     |     |     | 505 |     |     |     | 510 |     |
| Asn | Thr | Ile | Asp | Ala | Glu | Lys | Ile | Thr | Gln | Leu | Pro | Val | Val | Lys |
|     |     |     |     |     | 515 |     |     |     | 520 |     |     |     | 525 |     |
| Tyr | Ala | Leu | Ser | Ser | Gly | Ala | Ser | Ile | Ile | Glu | Gly | Pro | Gly | Phe |
|     |     |     |     |     | 530 |     |     |     | 535 |     |     |     | 540 |     |
| Gly | Gly | Asn | Leu | Leu | Phe | Leu | Lys | Glu | Ser | Ser | Asn | Ser | Ile | Ala |
|     |     |     |     |     | 545 |     |     |     | 550 |     |     |     | 555 |     |
| Phe | Lys | Val | Thr | Leu | Asn | Ser | Ala | Ala | Leu | Leu | Gln | Arg | Tyr | Arg |
|     |     |     |     |     | 565 |     |     |     | 570 |     |     |     | 575 |     |
| Arg | Ile | Arg | Tyr | Ala | Ser | Thr | Thr | Asn | Leu | Arg | Leu | Phe | Val | Gln |
|     |     |     |     |     | 580 |     |     |     | 585 |     |     |     | 590 |     |
| Ser | Asn | Asn | Asp | Phe | Leu | Val | Ile | Tyr | Ile | Asn | Lys | Thr | Met | Asn |
|     |     |     |     |     | 595 |     |     |     | 600 |     |     |     | 605 |     |
| Asp | Gly | Asp | Leu | Thr | Tyr | Gln | Thr | Phe | Asp | Phe | Ala | Thr | Ser | Asn |
|     |     |     |     |     | 610 |     |     |     | 615 |     |     |     | 620 |     |
| Asn | Met | Gly | Phe | Ser | Gly | Asp | Thr | Asn | Asp | Phe | Ile | Ile | Gly | Ala |
|     |     |     |     |     | 625 |     |     |     | 630 |     |     |     | 635 |     |
| Ser | Phe | Val | Ser | Asn | Glu | Lys | Ile | Tyr | Ile | Asp | Lys | Ile | Glu | Phe |
|     |     |     |     |     | 645 |     |     |     | 650 |     |     |     | 655 |     |
| Pro | Val | Gln |     |     |     |     |     |     |     |     |     |     |     |     |



<210> 8  
 <211> 1180  
 <212> PRT  
 <213> *Bacillus thuringiensis*

<400> 8  
 Met Asn Pro Tyr Gln Asn Lys Asn Glu Tyr Glu Thr Leu Asn Ala Ser  
 1 5 10 15  
 Gln Lys Lys Leu Asn Ile Ser Asn Asn Tyr Thr Arg Tyr Pro Ile Glu  
 20 25 30  
 Asn Ser Pro Lys Gln Leu Leu Gln Ser Thr Asn Tyr Lys Asp Trp Leu  
 35 40 45  
 Asn Met Cys Gln Gln Asn Gln Tyr Gly Gly Asp Phe Glu Thr Phe  
 50 55 60  
 Ile Asp Ser Gly Glu Leu Ser Ala Tyr Thr Ile Val Val Gly Thr Val  
 65 70 75 80  
 Leu Thr Gly Phe Gly Phe Thr Thr Pro Leu Gly Leu Ala Leu Ile Gly  
 85 90 95  
 Phe Gly Thr Leu Ile Pro Val Leu Phe Pro Ala Gln Asp Gln Ser Asn  
 100 105 110  
 Thr Trp Ser Asp Phe Ile Thr Gln Thr Lys Asn Ile Ile Lys Lys Glu  
 115 120 125  
 Ile Ala Ser Thr Tyr Ile Ser Asn Ala Asn Lys Ile Leu Asn Arg Ser  
 130 135 140  
 Phe Asn Val Ile Ser Thr Tyr His Asn His Leu Lys Thr Trp Glu Asn  
 145 150 155 160  
 Asn Pro Asn Pro Gln Asn Thr Gln Asp Val Arg Thr Gln Ile Gln Leu  
 165 170 175  
 Val His Tyr His Phe Gln Asn Val Ile Pro Glu Leu Val Asn Ser Cys  
 180 185 190  
 Pro Pro Asn Pro Ser Asp Cys Asp Tyr Tyr Asn Ile Leu Val Leu Ser  
 195 200 205  
 Ser Tyr Ala Gln Ala Ala Asn Leu His Leu Thr Val Leu Asn Gln Ala  
 210 215 220  
 Val Lys Phe Glu Ala Tyr Leu Lys Asn Asn Arg Gln Phe Asp Tyr Leu  
 225 230 235 240  
 Glu Pro Leu Pro Thr Ala Ile Asp Tyr Tyr Pro Val Leu Thr Lys Ala  
 245 250 255  
 Ile Glu Asp Tyr Thr Asn Tyr Cys Val Thr Thr Tyr Lys Lys Gly Leu  
 260 265 270  
 Asn Leu Ile Lys Thr Thr Pro Asp Ser Asn Leu Asp Gly Asn Ile Asn  
 275 280 285  
 Trp Asn Thr Tyr Asn Thr Tyr Arg Thr Lys Met Thr Thr Ala Val Leu  
 290 295 300  
 Asp Leu Val Ala Leu Phe Pro Asn Tyr Asp Val Gly Lys Tyr Pro Ile  
 305 310 315 320  
 Gly Val Gln Ser Glu Leu Thr Arg Glu Ile Tyr Gln Val Leu Asn Phe  
 325 330 335  
 Glu Glu Ser Pro Tyr Lys Tyr Tyr Asp Phe Gln Tyr Gln Glu Asp Ser  
 340 345 350  
 Leu Thr Arg Arg Pro His Leu Phe Thr Trp Leu Asp Ser Leu Asn Phe  
 355 360 365  
 Tyr Glu Lys Ala Gln Thr Thr Pro Asn Asn Phe Phe Thr Ser His Tyr  
 370 375 380  
 Asn Met Phe His Tyr Thr Leu Asp Asn Ile Ser Gln Lys Ser Ser Val  
 385 390 395 400  
 Phe Gly Asn His Asn Val Thr Asp Lys Leu Lys Ser Leu Gly Leu Ala



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |  |  |      |  |  |  |  |     |  |  |  |      |      |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|------|--|--|--|--|-----|--|--|--|------|------|-----|
| Glu | Gly | Ser | Asn | Arg | Cys | Glu | Thr | Ser | Ala | Val | Pro | Ala | Asn | Ile | Gly | 865 |  |  |  |  | 870  |  |  |  |  | 875 |  |  |  |      |      | 880 |
| Asn | Thr | Ser | Asp | Met | Leu | Tyr | Ser | Cys | Gln | Tyr | Asp | Thr | Gly | Lys | Lys |     |  |  |  |  | 885  |  |  |  |  |     |  |  |  |      | 895  |     |
| His | Val | Val | Cys | Gln | Asp | Ser | His | Gln | Phe | Ser | Phe | Thr | Ile | Asp | Thr |     |  |  |  |  | 900  |  |  |  |  |     |  |  |  |      | 910  |     |
| Gly | Ala | Leu | Asp | Thr | Asn | Glu | Asn | Ile | Gly | Val | Trp | Val | Met | Phe | Lys |     |  |  |  |  | 915  |  |  |  |  |     |  |  |  |      | 925  |     |
| Ile | Ser | Ser | Pro | Asp | Gly | Tyr | Ala | Ser | Leu | Asp | Asn | Leu | Glu | Val | Ile |     |  |  |  |  | 930  |  |  |  |  |     |  |  |  |      | 940  |     |
| Glu | Glu | Gly | Pro | Ile | Asp | Gly | Glu | Ala | Leu | Ser | Arg | Val | Lys | His | Met |     |  |  |  |  | 945  |  |  |  |  |     |  |  |  |      | 960  |     |
| Glu | Lys | Lys | Trp | Asn | Asp | Gln | Met | Glu | Ala | Lys | Arg | Ser | Glu | Thr | Gln |     |  |  |  |  | 950  |  |  |  |  |     |  |  |  |      | 975  |     |
| Gln | Ala | Tyr | Asp | Val | Ala | Lys | Gln | Ala | Ile | Asp | Ala | Leu | Phe | Thr | Asn |     |  |  |  |  | 980  |  |  |  |  |     |  |  |  |      | 990  |     |
| Val | Gln | Asp | Glu | Ala | Leu | Gln | Phe | Asp | Thr | Thr | Leu | Ala | Gln | Ile | Gln |     |  |  |  |  | 995  |  |  |  |  |     |  |  |  |      | 1005 |     |
| Tyr | Ala | Glu | Tyr | Leu | Val | Gln | Ser | Ile | Pro | Tyr | Val | Tyr | Asn | Asp | Trp |     |  |  |  |  | 1010 |  |  |  |  |     |  |  |  |      | 1020 |     |
| Leu | Ser | Asp | Val | Pro | Gly | Met | Asn | Tyr | Asp | Ile | Tyr | Val | Glu | Leu | Asp |     |  |  |  |  | 1025 |  |  |  |  |     |  |  |  |      | 1040 |     |
| Ala | Arg | Val | Ala | Gln | Ala | Arg | Tyr | Leu | Tyr | Asp | Thr | Arg | Asn | Ile | Ile |     |  |  |  |  | 1045 |  |  |  |  |     |  |  |  |      | 1055 |     |
| Lys | Asn | Gly | Asp | Phe | Thr | Gln | Gly | Val | Met | Gly | Trp | His | Val | Thr | Gly |     |  |  |  |  | 1060 |  |  |  |  |     |  |  |  |      | 1070 |     |
| Asn | Ala | Asp | Val | Gln | Gln | Ile | Asp | Gly | Val | Ser | Val | Leu | Val | Leu | Ser |     |  |  |  |  | 1075 |  |  |  |  |     |  |  |  |      | 1085 |     |
| Asn | Trp | Ser | Ala | Gly | Val | Ser | Gln | Asn | Val | His | Leu | Gln | His | Asn | His |     |  |  |  |  | 1090 |  |  |  |  |     |  |  |  |      | 1100 |     |
| Gly | Tyr | Val | Leu | Arg | Val | Ile | Ala | Lys | Lys | Glu | Gly | Pro | Gly | Asn | Gly |     |  |  |  |  | 1105 |  |  |  |  |     |  |  |  |      | 1120 |     |
| Tyr | Val | Thr | Leu | Met | Asp | Cys | Glu | Glu | Asn | Gln | Glu | Lys | Leu | Thr | Phe |     |  |  |  |  | 1125 |  |  |  |  |     |  |  |  |      | 1135 |     |
| Thr | Ser | Cys | Glu | Glu | Gly | Tyr | Ile | Thr | Lys | Thr | Val | Asp | Val | Phe | Pro |     |  |  |  |  | 1140 |  |  |  |  |     |  |  |  |      | 1150 |     |
| Asp | Thr | Asp | Arg | Val | Arg | Ile | Glu | Ile | Gly | Glu | Thr | Glu | Gly | Ser | Phe |     |  |  |  |  | 1155 |  |  |  |  |     |  |  |  |      | 1165 |     |
| Tyr | Ile | Glu | Ser | Ile | Glu | Leu | Ile | Cys | Met | Asn | Glu |     |     |     |     |     |  |  |  |  | 1170 |  |  |  |  |     |  |  |  | 1180 |      |     |

<210> 9

<211> 475

<212> PRT

<213> *Bacillus thuringiensis*

<400> 9

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |    |  |  |  |  |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|----|--|--|--|--|----|----|
| Met | Ile | Ile | Asp | Ser | Lys | Thr | Thr | Leu | Pro | Arg | His | Ser | Leu | Ile | His | 1 |  |  |  |  |  | 5  |  |  |  |  |  |  |  |  |  | 10 |  |  |  |  |    | 15 |
| Thr | Ile | Lys | Leu | Asn | Ser | Asn | Lys | Lys | Tyr | Gly | Pro | Gly | Asp | Met | Thr |   |  |  |  |  |  | 20 |  |  |  |  |  |  |  |  |  | 25 |  |  |  |  | 30 |    |
| Asn | Gly | Asn | Gln | Phe | Ile | Ile | Ser | Lys | Gln | Glu | Trp | Ala | Thr | Ile | Gly |   |  |  |  |  |  | 35 |  |  |  |  |  |  |  |  |  | 40 |  |  |  |  | 45 |    |
| Ala | Tyr | Ile | Gln | Thr | Gly | Leu | Gly | Leu | Pro | Val | Asn | Glu | Gln | Gln | Leu |   |  |  |  |  |  | 50 |  |  |  |  |  |  |  |  |  | 55 |  |  |  |  | 60 |    |
| Arg | Thr | His | Val | Asn | Leu | Ser | Gln | Asp | Ile | Ser | Ile | Pro | Ser | Asp | Phe |   |  |  |  |  |  |    |  |  |  |  |  |  |  |  |  |    |  |  |  |  |    |    |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Ser | Gln | Leu | Tyr | Asp | Val | Tyr | Cys | Ser | Asp | Lys | Thr | Ser | Ala | Glu | Trp |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Trp | Asn | Lys | Asn | Leu | Tyr | Pro | Leu | Ile | Ile | Lys | Ser | Ala | Asn | Asp | Ile |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Ala | Ser | Tyr | Gly | Phe | Lys | Val | Ala | Gly | Asp | Pro | Ser | Ile | Lys | Lys | Asp |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Gly | Tyr | Phe | Lys | Lys | Leu | Gln | Asp | Glu | Leu | Asp | Asn | Ile | Val | Asp | Asn |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Asn | Ser | Asp | Asp | Asp | Ala | Ile | Ala | Lys | Ala | Ile | Lys | Asp | Phe | Lys | Ala |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Arg | Cys | Gly | Ile | Leu | Ile | Lys | Glu | Ala | Lys | Gln | Tyr | Glu | Glu | Ala | Ala |
|     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |     |
| Lys | Asn | Ile | Val | Thr | Ser | Leu | Asp | Gln | Phe | Leu | His | Gly | Asp | Gln | Lys |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Lys | Leu | Glu | Gly | Val | Ile | Asn | Ile | Gln | Lys | Arg | Leu | Lys | Glu | Val | Gln |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Thr | Ala | Leu | Asn | Gln | Ala | His | Gly | Glu | Ser | Ser | Pro | Ala | His | Lys | Glu |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Leu | Leu | Glu | Lys | Val | Lys | Asn | Leu | Lys | Thr | Thr | Leu | Glu | Arg | Thr | Ile |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Lys | Ala | Glu | Gln | Asp | Leu | Glu | Lys | Lys | Val | Glu | Tyr | Ser | Phe | Leu | Leu |
|     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |     |
| Gly | Pro | Leu | Leu | Gly | Phe | Val | Val | Tyr | Glu | Ile | Leu | Glu | Asn | Thr | Ala |
|     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |
| Val | Gln | His | Ile | Lys | Asn | Gln | Ile | Asp | Glu | Ile | Lys | Lys | Gln | Leu | Asp |
|     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |     |
| Ser | Ala | Gln | His | Asp | Leu | Asp | Arg | Asp | Val | Lys | Ile | Ile | Gly | Met | Leu |
|     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |     |
| Asn | Ser | Ile | Asn | Thr | Asp | Ile | Asp | Asn | Leu | Tyr | Ser | Gln | Gly | Gln | Glu |
| 305 |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     |     | 320 |
| Ala | Ile | Lys | Val | Phe | Gln | Lys | Leu | Gln | Gly | Ile | Trp | Ala | Thr | Ile | Gly |
|     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |     |
| Ala | Gln | Ile | Glu | Asn | Leu | Arg | Thr | Thr | Ser | Leu | Gln | Glu | Val | Gln | Asp |
|     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |     |
| Ser | Asp | Asp | Ala | Asp | Glu | Ile | Gln | Ile | Glu | Leu | Glu | Asp | Ala | Ser | Asp |
|     | 355 |     |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Ala | Trp | Leu | Val | Val | Ala | Gln | Glu | Ala | Arg | Asp | Phe | Thr | Leu | Asn | Ala |
|     | 370 |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |     |
| Tyr | Ser | Thr | Asn | Ser | Arg | Gln | Asn | Leu | Pro | Ile | Asn | Val | Ile | Ser | Asp |
| 385 |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     |     | 400 |
| Ser | Cys | Asn | Cys | Ser | Thr | Thr | Asn | Met | Thr | Ser | Asn | Gln | Tyr | Ser | Asn |
|     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |     |
| Pro | Thr | Thr | Asn | Met | Thr | Ser | Asn | Gln | Tyr | Met | Ile | Ser | His | Glu | Tyr |
|     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |     |
| Thr | Ser | Leu | Pro | Asn | Asn | Phe | Met | Leu | Ser | Arg | Asn | Ser | Asn | Leu | Glu |
|     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |     |
| Tyr | Lys | Cys | Pro | Glu | Asn | Asn | Phe | Met | Ile | Tyr | Trp | Tyr | Asn | Asn | Ser |
|     | 450 |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |     |
| Asp | Trp | Tyr | Asn | Asn | Ser | Asp | Trp | Tyr | Asn | Asn |     |     |     |     |     |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     |     |

<210> 10  
 <211> 1138  
 <212> PRT  
 <213> Bacillus thuringiensis

<400> 10

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Leu | Asn | Asn | Leu | Asp | Gly | Tyr | Glu | Asp | Ser | Asn | Arg | Thr | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Asn | Asn | Ser | Leu | Asn | Tyr | Pro | Thr | Gln | Lys | Ala | Leu | Ser | Pro | Ser | Leu |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Lys | Asn | Met | Asn | Tyr | Gln | Asp | Phe | Leu | Ser | Ile | Thr | Glu | Arg | Glu | Gln |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Pro | Glu | Ala | Leu | Ala | Ser | Gly | Asn | Thr | Ala | Ile | Asn | Thr | Val | Val | Ser |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Val | Thr | Gly | Ala | Thr | Leu | Ser | Ala | Leu | Gly | Val | Pro | Gly | Ala | Ser | Phe |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Ile | Thr | Asn | Phe | Tyr | Leu | Lys | Ile | Ala | Gly | Leu | Leu | Trp | Pro | Glu | Asn |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Gly | Lys | Ile | Trp | Asp | Glu | Phe | Met | Thr | Glu | Val | Glu | Ala | Leu | Ile | Asp |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Gln | Lys | Ile | Glu | Glu | Tyr | Val | Arg | Asn | Lys | Ala | Ile | Ala | Glu | Leu | Asp |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Gly | Leu | Gly | Ser | Ala | Leu | Asp | Lys | Tyr | Gln | Lys | Ala | Leu | Ala | Asp | Trp |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Leu | Gly | Lys | Gln | Asp | Asp | Pro | Glu | Ala | Ile | Leu | Ser | Val | Ala | Thr | Glu |
| 145 |     |     |     | 150 |     |     |     |     |     | 155 |     |     |     |     | 160 |
| Phe | Arg | Ile | Ile | Asp | Ser | Leu | Phe | Glu | Phe | Ser | Met | Pro | Ser | Phe | Lys |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Val | Thr | Gly | Tyr | Glu | Ile | Pro | Leu | Leu | Thr | Val | Tyr | Ala | Gln | Ala | Ala |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Asn | Leu | His | Leu | Ala | Leu | Leu | Arg | Asp | Ser | Thr | Leu | Tyr | Gly | Asp | Lys |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Trp | Gly | Phe | Thr | Gln | Asn | Asn | Ile | Glu | Glu | Asn | Tyr | Asn | Arg | Gln | Lys |
|     | 210 |     |     |     | 215 |     |     |     |     |     | 220 |     |     |     |     |
| Lys | Arg | Ile | Ser | Glu | Tyr | Ser | Asp | His | Cys | Thr | Lys | Trp | Tyr | Asn | Ser |
| 225 |     |     |     | 230 |     |     |     |     |     | 235 |     |     |     |     | 240 |
| Gly | Leu | Ser | Arg | Leu | Asn | Gly | Ser | Thr | Tyr | Glu | Gln | Trp | Ile | Asn | Tyr |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Asn | Arg | Phe | Arg | Arg | Glu | Met | Ile | Leu | Met | Ala | Leu | Asp | Leu | Val | Ala |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Val | Phe | Pro | Phe | His | Asp | Pro | Arg | Arg | Tyr | Ser | Met | Glu | Thr | Ser | Thr |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Gln | Leu | Thr | Arg | Glu | Val | Tyr | Thr | Asp | Pro | Val | Ser | Leu | Ser | Ile | Ser |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Asn | Pro | Asp | Ile | Gly | Pro | Ser | Phe | Ser | Gln | Met | Glu | Asn | Thr | Ala | Ile |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Arg | Thr | Pro | His | Leu | Val | Asp | Tyr | Leu | Asp | Glu | Leu | Tyr | Ile | Tyr | Thr |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Ser | Lys | Tyr | Lys | Ala | Phe | Ser | His | Glu | Ile | Gln | Pro | Asp | Leu | Phe | Tyr |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Trp | Ser | Ala | His | Lys | Val | Ser | Phe | Lys | Lys | Ser | Glu | Gln | Ser | Asn | Leu |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Tyr | Thr | Thr | Gly | Ile | Tyr | Gly | Lys | Thr | Ser | Gly | Tyr | Ile | Ser | Ser | Gly |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Ala | Tyr | Ser | Phe | His | Gly | Asn | Asp | Ile | Tyr | Arg | Thr | Leu | Ala | Ala | Pro |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Ser | Val | Val | Val | Tyr | Pro | Tyr | Thr | Gln | Asn | Tyr | Gly | Val | Glu | Gln | Val |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Glu | Phe | Tyr | Gly | Val | Lys | Gly | His | Val | His | Tyr | Arg | Gly | Asp | Asn | Lys |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Tyr | Asp | Leu | Thr | Tyr | Asp | Ser | Ile | Asp | Gln | Leu | Pro | Pro | Asp | Gly | Glu |



Ile Gly Glu Ala Leu Ala Arg Val Lys Arg Gln Glu Thr Lys Trp Arg  
                     900                    905                    910  
 Asn Lys Leu Ala Gln Leu Thr Thr Glu Thr Gln Ala Ile Tyr Thr Arg  
                     915                    920                    925  
 Ala Lys Gln Ala Leu Asp Asn Leu Phe Ala Asn Ala Gln Asp Ser His  
                     930                    935                    940  
 Leu Lys Arg Asp Val Thr Phe Ala Glu Ile Ala Ala Ala Arg Lys Ile  
 945                    950                    955                    960  
 Val Gln Ser Ile Arg Glu Ala Tyr Met Ser Trp Leu Ser Val Val Pro  
                     965                    970                    975  
 Gly Val Asn His Pro Ile Phe Thr Glu Leu Ser Gly Arg Val Gln Arg  
                     980                    985                    990  
 Ala Phe Gln Leu Tyr Asp Val Arg Asn Val Val Arg Asn Gly Arg Phe  
                     995                    1000                    1005  
 Leu Asn Gly Leu Ser Asp Trp Ile Val Thr Ser Asp Val Lys Val Gln  
                     1010                    1015                    1020  
 Glu Glu Asn Gly Asn Asn Val Leu Val Leu Asn Asn Trp Asp Ala Gln  
 1025                    1030                    1035                    1040  
 Val Leu Gln Asn Val Lys Leu Tyr Gln Asp Arg Gly Tyr Ile Leu His  
                     1045                    1050                    1055  
 Val Thr Ala Arg Lys Ile Gly Ile Gly Glu Gly Tyr Ile Thr Ile Thr  
                     1060                    1065                    1070  
 Asp Glu Glu Gly His Thr Asp Gln Leu Arg Phe Thr Ala Cys Glu Glu  
                     1075                    1080                    1085  
 Ile Asp Ala Ser Asn Ala Phe Ile Ser Gly Tyr Ile Thr Lys Glu Leu  
                     1090                    1095                    1100  
 Glu Phe Phe Pro Asp Thr Glu Lys Val His Ile Glu Ile Gly Glu Thr  
 1105                    1110                    1115                    1120  
 Glu Gly Ile Phe Leu Val Glu Ser Ile Glu Leu Phe Leu Met Glu Glu  
                     1125                    1130                    1135  
 Leu Cys

<210> 11  
 <211> 1157  
 <212> PRT  
 <213> *Bacillus thuringiensis*

<400> 11  
 Met Ser Pro Asn Asn Gln Asn Glu Tyr Glu Ile Ile Asp Ala Thr Pro  
 1                    5                    10                    15  
 Ser Thr Ser Val Ser Ser Asp Ser Asn Arg Tyr Pro Phe Ala Asn Glu  
                     20                    25                    30  
 Pro Thr Asp Ala Leu Gln Asn Met Asn Tyr Lys Asp Tyr Leu Lys Met  
                     35                    40                    45  
 Ser Gly Gly Glu Asn Pro Glu Leu Phe Gly Asn Pro Glu Thr Phe Ile  
 50                    55                    60  
 Ser Ser Ser Thr Ile Gln Thr Gly Ile Gly Ile Val Gly Arg Ile Leu  
 65                    70                    75                    80  
 Gly Ala Leu Gly Val Pro Phe Ala Ser Gln Ile Ala Ser Phe Tyr Ser  
                     85                    90                    95  
 Phe Ile Val Gly Gln Leu Trp Pro Ser Lys Ser Val Asp Ile Trp Gly  
                     100                    105                    110  
 Glu Ile Met Glu Arg Val Glu Glu Leu Val Asp Gln Lys Ile Glu Lys  
                     115                    120                    125  
 Tyr Val Lys Asp Lys Ala Leu Ala Glu Leu Lys Gly Leu Gly Asn Ala

|                                                                 |     |     |
|-----------------------------------------------------------------|-----|-----|
| 130                                                             | 135 | 140 |
| Leu Asp Val Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asn |     |     |
| 145                                                             | 150 | 155 |
| Asp Ala Arg Thr Arg Ser Val Val Ser Asn Gln Phe Ile Ala Leu Asp |     | 160 |
|                                                                 | 165 | 170 |
| Leu Asn Phe Val Ser Ser Ile Pro Ser Phe Ala Val Ser Gly His Glu |     | 175 |
|                                                                 | 180 | 185 |
| Val Leu Leu Leu Ala Val Tyr Ala Gln Ala Val Asn Leu His Leu Leu |     | 190 |
|                                                                 | 195 | 200 |
| Leu Leu Arg Asp Ala Ser Ile Phe Gly Glu Glu Trp Gly Phe Thr Pro |     | 205 |
|                                                                 | 210 | 215 |
| Gly Glu Ile Ser Arg Phe Tyr Asn Arg Gln Val Gln Leu Thr Ala Glu |     | 220 |
| 225                                                             | 230 | 235 |
| Tyr Ser Asp Tyr Cys Val Lys Trp Tyr Lys Ile Gly Leu Asp Lys Leu |     | 240 |
|                                                                 | 245 | 250 |
| Lys Gly Thr Thr Ser Lys Ser Trp Leu Asn Tyr His Gln Phe Arg Arg |     | 255 |
|                                                                 | 260 | 265 |
| Glu Met Thr Leu Leu Val Leu Asp Leu Val Ala Leu Phe Pro Asn Tyr |     | 270 |
|                                                                 | 275 | 280 |
| Asp Thr His Met Tyr Pro Ile Glu Thr Thr Ala Gln Leu Thr Arg Asp |     | 285 |
|                                                                 | 290 | 295 |
| Val Tyr Thr Asp Pro Ile Ala Phe Asn Ile Val Thr Ser Thr Gly Phe |     | 300 |
| 305                                                             | 310 | 315 |
| Cys Asn Pro Trp Ser Thr His Ser Gly Ile Leu Phe Tyr Glu Val Glu |     | 320 |
|                                                                 | 325 | 330 |
| Asn Asn Val Ile Arg Pro Pro His Leu Phe Asp Ile Leu Ser Ser Val |     | 335 |
|                                                                 | 340 | 345 |
| Glu Ile Asn Thr Ser Arg Gly Gly Ile Thr Leu Asn Asn Asp Ala Tyr |     | 350 |
|                                                                 | 355 | 360 |
| Ile Asn Tyr Trp Ser Gly His Thr Leu Lys Tyr Arg Arg Thr Ala Asp |     | 365 |
|                                                                 | 370 | 375 |
| Ser Thr Val Thr Tyr Thr Ala Asn Tyr Gly Arg Ile Thr Ser Glu Lys |     | 380 |
| 385                                                             | 390 | 395 |
| Asn Ser Phe Ala Leu Glu Asp Arg Asp Ile Phe Glu Ile Asn Ser Thr |     | 400 |
|                                                                 | 405 | 410 |
| Val Ala Asn Leu Ala Asn Tyr Tyr Gln Lys Ala Tyr Gly Val Pro Gly |     | 415 |
|                                                                 | 420 | 425 |
| Ser Trp Phe His Met Val Lys Arg Gly Thr Ser Ser Thr Thr Ala Tyr |     | 430 |
|                                                                 | 435 | 440 |
| Leu Tyr Ser Lys Thr His Thr Ala Leu Gln Gly Cys Thr Gln Val Tyr |     | 445 |
|                                                                 | 450 | 455 |
| Glu Ser Ser Asp Glu Ile Pro Leu Asp Arg Thr Val Pro Val Ala Glu |     | 460 |
| 465                                                             | 470 | 475 |
| Ser Tyr Ser His Arg Leu Ser His Ile Thr Ser His Ser Phe Ser Lys |     | 480 |
|                                                                 | 485 | 490 |
| Asn Gly Ser Ala Tyr Tyr Gly Ser Phe Pro Val Phe Val Trp Thr His |     | 495 |
|                                                                 | 500 | 505 |
| Thr Ser Ala Asp Leu Asn Asn Thr Ile Tyr Ser Asp Lys Ile Thr Gln |     | 510 |
|                                                                 | 515 | 520 |
| Ile Pro Ala Val Lys Gly Asp Met Leu Tyr Leu Gly Gly Ser Val Val |     | 525 |
|                                                                 | 530 | 535 |
| Gln Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Lys Arg Thr Asn Pro |     | 540 |
| 545                                                             | 550 | 555 |
| Ser Ile Leu Gly Thr Phe Ala Val Thr Val Asn Gly Ser Leu Ser Gln |     | 560 |
|                                                                 | 565 | 570 |
| Arg Tyr Arg Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Phe Glu Phe |     | 575 |
|                                                                 | 580 | 585 |
|                                                                 |     | 590 |



|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Leu | Tyr | Leu | Gly | Asp | Thr | Ile | Glu | Lys | Asn | Arg | Phe | Asn | Lys | Thr |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Met | Asp | Asn | Gly | Ala | Ser | Leu | Thr | Tyr | Glu | Thr | Phe | Lys | Phe | Ala | Ser |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Phe | Ile | Thr | Asp | Phe | Gln | Phe | Arg | Glu | Thr | Gln | Asp | Lys | Ile | Leu | Leu |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Ser | Met | Gly | Asp | Phe | Ser | Ser | Gly | Gln | Glu | Val | Tyr | Ile | Asp | Arg | Ile |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Glu | Phe | Ile | Pro | Val | Asp | Glu | Thr | Tyr | Glu | Ala | Glu | Gln | Asp | Leu | Glu |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Ala | Ala | Lys | Lys | Ala | Val | Asn | Ala | Leu | Phe | Thr | Asn | Thr | Lys | Asp | Gly |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Leu | Arg | Pro | Gly | Val | Thr | Asp | Tyr | Glu | Val | Asn | Gln | Ala | Ala | Asn | Leu |
|     |     | 690 |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Val | Glu | Cys | Leu | Ser | Asp | Leu | Tyr | Pro | Asn | Glu | Lys | Arg | Leu | Leu |     |
| 705 |     |     |     |     | 710 |     |     |     | 715 |     |     |     |     | 720 |     |
| Phe | Asp | Ala | Val | Arg | Glu | Ala | Lys | Arg | Leu | Ser | Gly | Ala | Arg | Asn | Leu |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |
| Leu | Gln | Asp | Pro | Asp | Phe | Gln | Glu | Ile | Asn | Gly | Glu | Asn | Gly | Trp | Ala |
|     |     |     | 740 |     |     |     | 745 |     |     |     |     |     | 750 |     |     |
| Ala | Ser | Thr | Gly | Ile | Glu | Ile | Val | Glu | Gly | Asp | Ala | Val | Phe | Lys | Gly |
|     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
| Arg | Tyr | Leu | Arg | Leu | Pro | Gly | Ala | Arg | Glu | Ile | Asp | Thr | Glu | Thr | Tyr |
|     |     | 770 |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |
| Pro | Thr | Tyr | Leu | Tyr | Gln | Lys | Val | Glu | Glu | Gly | Val | Leu | Lys | Pro | Tyr |
| 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     | 800 |     |
| Thr | Arg | Tyr | Arg | Leu | Arg | Gly | Phe | Val | Gly | Ser | Ser | Gln | Gly | Leu | Glu |
|     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
| Ile | Tyr | Thr | Ile | Arg | His | Gln | Thr | Asn | Arg | Ile | Val | Lys | Asn | Val | Pro |
|     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |
| Asp | Asp | Leu | Leu | Pro | Asp | Val | Ser | Pro | Val | Asn | Ser | Asp | Gly | Ser | Ile |
|     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |
| Asn | Arg | Cys | Ser | Glu | Gln | Lys | Tyr | Val | Asn | Ser | Arg | Leu | Glu | Gly | Glu |
|     |     | 850 |     |     |     | 855 |     |     |     |     | 860 |     |     |     |     |
| Asn | Arg | Ser | Gly | Asp | Ala | His | Glu | Phe | Ser | Leu | Pro | Ile | Asp | Ile | Gly |
| 865 |     |     |     |     | 870 |     |     |     |     | 875 |     |     |     |     | 880 |
| Glu | Leu | Asp | Tyr | Asn | Glu | Asn | Ala | Gly | Ile | Trp | Val | Gly | Phe | Lys | Ile |
|     |     |     |     | 885 |     |     |     |     | 890 |     |     |     |     | 895 |     |
| Thr | Asp | Pro | Glu | Gly | Tyr | Ala | Thr | Leu | Gly | Asn | Leu | Glu | Leu | Val | Glu |
|     |     |     | 900 |     |     |     |     | 905 |     |     |     |     | 910 |     |     |
| Glu | Gly | Pro | Leu | Ser | Gly | Asp | Ala | Leu | Glu | Arg | Leu | Gln | Arg | Glu | Glu |
|     |     | 915 |     |     |     |     | 920 |     |     |     |     | 925 |     |     |     |
| Gln | Gln | Trp | Lys | Ile | Gln | Met | Thr | Arg | Arg | Arg | Glu | Glu | Thr | Asp | Arg |
|     |     |     |     |     |     | 935 |     |     |     |     | 940 |     |     |     |     |
| Arg | Tyr | Met |     |     |     |     |     |     |     |     |     |     |     |     |     |

|      |     |     |     |      |      |      |     |     |      |      |      |     |      |      |      |  |  |
|------|-----|-----|-----|------|------|------|-----|-----|------|------|------|-----|------|------|------|--|--|
|      |     |     |     | 1045 |      |      |     |     | 1050 |      |      |     | 1055 |      |      |  |  |
| Trp  | Asp | Glu | Gln | Val  | Ser  | Gln  | Gln | Phe | Thr  | Val  | Gln  | Pro | Asn  | Gln  | Arg  |  |  |
|      |     |     |     | 1060 |      |      |     |     | 1065 |      |      |     | 1070 |      |      |  |  |
| Tyr  | Val | Leu | Arg | Val  | Thr  | Ala  | Arg | Lys | Glu  | Gly  | Val  | Gly | Asn  | Gly  | Tyr  |  |  |
|      |     |     |     | 1075 |      |      |     |     | 1080 |      |      |     | 1085 |      |      |  |  |
| Val  | Ser | Ile | Arg | Asp  | Gly  | Gly  | Asn | Gln | Ser  | Glu  | Thr  | Leu | Thr  | Phe  | Ser  |  |  |
|      |     |     |     | 1090 |      |      |     |     | 1095 |      |      |     | 1100 |      |      |  |  |
| Ala  | Ser | Asp | Tyr | Asp  | Thr  | Asn  | Gly | Val | Tyr  | Asn  | Asp  | Gln | Thr  | Gly  | Tyr  |  |  |
| 1105 |     |     |     |      |      | 1110 |     |     |      |      | 1115 |     |      |      | 1120 |  |  |
| Ile  | Thr | Lys | Thr | Val  | Thr  | Phe  | Ile | Pro | Tyr  | Thr  | Asp  | Gln | Met  | Trp  | Ile  |  |  |
|      |     |     |     |      | 1125 |      |     |     |      | 1130 |      |     |      |      | 1135 |  |  |
| Glu  | Ile | Ser | Glu | Thr  | Glu  | Gly  | Thr | Phe | Tyr  | Ile  | Glu  | Ser | Val  | Glu  | Leu  |  |  |
|      |     |     |     | 1140 |      |      |     |     | 1145 |      |      |     |      | 1150 |      |  |  |
| Ile  | Val | Asp | Val | Glu  |      |      |     |     |      |      |      |     |      |      |      |  |  |
|      |     |     |     | 1155 |      |      |     |     |      |      |      |     |      |      |      |  |  |

<210> 12

<211> 675

<212> PRT

<213> Bacillus thuringiensis

<400> 12

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Met | Asn | Pro | Tyr | Gln | Asn | Lys | Asn | Glu | Tyr | Glu | Ile | Phe | Asn | Ala | Pro |  |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |  |  |
| Ser | Asn | Gly | Phe | Ser | Lys | Ser | Asn | Asn | Tyr | Ser | Arg | Tyr | Pro | Leu | Ala |  |  |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |  |  |
| Asn | Lys | Pro | Asn | Gln | Pro | Leu | Lys | Asn | Thr | Asn | Tyr | Lys | Asp | Trp | Leu |  |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |  |  |
| Asn | Val | Cys | Gln | Asp | Asn | Gln | Tyr | Gly | Asn | Asn | Ala | Gly | Asn | Phe |     |  |  |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |  |  |
| Ala | Ser | Ser | Glu | Thr | Ile | Val | Gly | Val | Ser | Ala | Gly | Ile | Ile | Val | Val |  |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |  |  |
| Gly | Thr | Met | Leu | Gly | Ala | Phe | Ala | Ala | Pro | Val | Leu | Ala | Ala | Gly | Ile |  |  |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |  |
| Ile | Ser | Phe | Gly | Thr | Leu | Leu | Pro | Ile | Phe | Trp | Gln | Gly | Ser | Asp | Pro |  |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |  |
| Ala | Asn | Val | Trp | Gln | Asp | Leu | Leu | Asn | Ile | Gly | Gly | Arg | Pro | Ile | Gln |  |  |
|     |     | 115 |     |     |     | 120 |     |     |     |     |     | 125 |     |     |     |  |  |
| Glu | Ile | Asp | Lys | Asn | Ile | Ile | Asn | Val | Leu | Thr | Ser | Ile | Val | Thr | Pro |  |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |  |
| Ile | Lys | Asn | Gln | Leu | Asp | Lys | Tyr | Gln | Glu | Phe | Phe | Asp | Lys | Trp | Glu |  |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     | 160 |     |  |  |
| Pro | Ala | Arg | Thr | His | Ala | Asn | Ala | Lys | Ala | Val | His | Asp | Leu | Phe | Thr |  |  |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |  |
| Thr | Leu | Glu | Pro | Ile | Ile | Asp | Lys | Asp | Leu | Asp | Met | Leu | Lys | Asn | Asn |  |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |  |
| Ala | Ser | Tyr | Arg | Ile | Pro | Thr | Leu | Pro | Ala | Tyr | Ala | Gln | Ile | Ala | Thr |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |  |
| Trp | His | Leu | Asn | Leu | Leu | Lys | His | Ala | Ala | Thr | Tyr | Tyr | Asn | Ile | Trp |  |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     |     | 220 |     |     |     |  |  |
| Leu | Gln | Asn | Gln | Gly | Ile | Asn | Pro | Ser | Thr | Phe | Asn | Ser | Ser | Asn | Tyr |  |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     | 240 |     |  |  |
| Tyr | Gln | Gly | Tyr | Leu | Lys | Arg | Lys | Ile | Gln | Glu | Tyr | Thr | Asp | Tyr | Cys |  |  |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |  |  |
| Ile | Gln | Thr | Tyr | Asn | Ala | Gly | Leu | Thr | Met | Ile | Arg | Thr | Asn | Thr | Asn |  |  |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Thr | Trp | Asn | Met | Tyr | Asn | Thr | Tyr | Arg | Leu | Glu | Met | Thr | Leu | Thr |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Val | Leu | Asp | Leu | Ile | Ala | Ile | Phe | Pro | Asn | Tyr | Asp | Pro | Glu | Lys | Tyr |
|     |     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |
| Pro | Ile | Gly | Val | Lys | Ser | Glu | Leu | Ile | Arg | Glu | Val | Tyr | Thr | Asn | Val |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Asn | Ser | Asp | Thr | Phe | Arg | Thr | Ile | Thr | Glu | Leu | Glu | Asn | Gly | Leu | Thr |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Arg | Asn | Pro | Thr | Leu | Phe | Thr | Trp | Ile | Asn | Gln | Gly | Arg | Phe | Tyr | Thr |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Arg | Asn | Ser | Arg | Asp | Ile | Leu | Asp | Pro | Tyr | Asp | Ile | Phe | Ser | Phe | Thr |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Gly | Asn | Gln | Met | Ala | Phe | Thr | His | Thr | Asn | Asp | Asp | Arg | Asn | Ile | Ile |
|     |     | 370 |     |     |     |     | 375 |     |     |     | 380 |     |     |     |     |
| Trp | Gly | Ala | Val | His | Gly | Asn | Ile | Ile | Ser | Gln | Asp | Thr | Ser | Lys | Val |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Phe | Pro | Phe | Tyr | Arg | Asn | Lys | Pro | Ile | Asp | Lys | Val | Glu | Ile | Val | Arg |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| His | Arg | Glu | Tyr | Ser | Asp | Ile | Ile | Tyr | Glu | Met | Ile | Phe | Phe | Ser | Asn |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     | 430 |     |     |     |
| Ser | Ser | Glu | Val | Phe | Arg | Tyr | Ser | Ser | Asn | Ser | Thr | Ile | Glu | Asn | Asn |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Tyr | Lys | Arg | Thr | Asp | Ser | Tyr | Met | Ile | Pro | Lys | Gln | Thr | Trp | Lys | Asn |
|     |     | 450 |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Glu | Glu | Tyr | Gly | His | Thr | Leu | Ser | Tyr | Ile | Lys | Thr | Asp | Asn | Tyr | Ile |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Phe | Ser | Val | Val | Arg | Glu | Arg | Arg | Arg | Val | Ala | Phe | Ser | Trp | Thr | His |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Thr | Ser | Val | Asp | Phe | Gln | Asn | Thr | Ile | Asp | Leu | Asp | Asn | Ile | Thr | Gln |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Ile | His | Ala | Leu | Lys | Ala | Leu | Lys | Val | Ser | Ser | Asp | Ser | Lys | Ile | Val |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Lys | Gly | Pro | Gly | His | Thr | Gly | Gly | Asp | Leu | Val | Ile | Leu | Lys | Asp | Ser |
|     |     | 530 |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Met | Asp | Phe | Arg | Val | Arg | Phe | Leu | Lys | Asn | Val | Ser | Arg | Gln | Tyr | Gln |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Val | Arg | Ile | Arg | Tyr | Ala | Thr | Asn | Ala | Pro | Lys | Thr | Thr | Val | Phe | Leu |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Thr | Gly | Ile | Asp | Thr | Ile | Ser | Val | Glu | Leu | Pro | Ser | Thr | Thr | Ser | Arg |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Gln | Asn | Pro | Asn | Ala | Thr | Asp | Leu | Thr | Tyr | Ala | Asp | Phe | Gly | Tyr | Val |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Thr | Phe | Pro | Arg | Thr | Val | Pro | Asn | Lys | Thr | Phe | Glu | Gly | Glu | Asp | Thr |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Leu | Leu | Met | Thr | Leu | Tyr | Gly | Thr | Pro | Asn | His | Ser | Tyr | Asn | Ile | Tyr |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Ile | Asp | Lys | Ile | Glu | Phe | Ile | Pro | Ile | Thr | Gln | Ser | Val | Leu | Asp | Tyr |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Thr | Glu | Lys | Gln | Asn | Ile | Glu | Lys | Thr | Gln | Lys | Ile | Val | Asn | Asp | Leu |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Phe | Val | Asn |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     |     | 675 |     |     |     |     |     |     |     |     |     |     |     |     |     |

<210> 13  
 <211> 648  
 <212> PRT

<213> *Bacillus thuringiensis*

<400> 13

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | His | Tyr | Tyr | Gly | Asn | Arg | Asn | Glu | Tyr | Asp | Ile | Leu | Asn | Ala | Ser | 1   | 5   | 10  | 15  |
| Ser | Asn | Asp | Ser | Asn | Met | Ser | Asn | Thr | Tyr | Pro | Arg | Tyr | Pro | Leu | Ala | 20  | 25  | 30  |     |
| Asn | Pro | Gln | Gln | Asp | Leu | Met | Gln | Asn | Thr | Asn | Tyr | Lys | Asp | Trp | Leu | 35  | 40  | 45  |     |
| Asn | Val | Cys | Glu | Gly | Tyr | His | Ile | Glu | Asn | Pro | Arg | Glu | Ala | Ser | Val | 50  | 55  | 60  |     |
| Arg | Ala | Gly | Leu | Gly | Lys | Gly | Leu | Gly | Ile | Val | Ser | Thr | Ile | Val | Gly | 65  | 70  | 75  | 80  |
| Phe | Phe | Gly | Gly | Ser | Ile | Ile | Leu | Asp | Thr | Ile | Gly | Leu | Phe | Tyr | Gln | 85  | 90  | 95  |     |
| Ile | Ser | Glu | Leu | Leu | Trp | Pro | Glu | Asp | Asp | Thr | Gln | Gln | Tyr | Thr | Trp | 100 | 105 | 110 |     |
| Gln | Asp | Ile | Met | Asn | His | Val | Glu | Asp | Leu | Ile | Asp | Lys | Arg | Ile | Thr | 115 | 120 | 125 |     |
| Glu | Val | Ile | Arg | Gly | Asn | Ala | Ile | Arg | Thr | Leu | Ala | Asp | Leu | Gln | Gly | 130 | 135 | 140 |     |
| Lys | Val | Asp | Asp | Tyr | Asn | Asn | Trp | Leu | Lys | Lys | Trp | Lys | Asp | Asp | Pro | 145 | 150 | 155 | 160 |
| Lys | Ser | Thr | Gly | Asn | Leu | Ser | Thr | Leu | Val | Thr | Lys | Phe | Thr | Ala | Leu | 165 | 170 | 175 |     |
| Asp | Ser | Asp | Phe | Asn | Gly | Ala | Ile | Arg | Thr | Val | Asn | Asn | Gln | Gly | Ser | 180 | 185 | 190 |     |
| Pro | Gly | Tyr | Glu | Leu | Leu | Leu | Leu | Pro | Val | Tyr | Ala | Gln | Ile | Ala | Asn | 195 | 200 | 205 |     |
| Leu | His | Leu | Leu | Leu | Leu | Arg | Asp | Ala | Gln | Ile | Tyr | Gly | Asp | Lys | Trp | 210 | 215 | 220 |     |
| Trp | Ser | Ala | Arg | Ala | Asn | Ala | Arg | Asp | Asn | Tyr | Tyr | Gln | Ile | Gln | Leu | 225 | 230 | 235 | 240 |
| Glu | Lys | Thr | Lys | Glu | Tyr | Thr | Glu | Tyr | Cys | Ile | Asn | Trp | Tyr | Asn | Lys | 245 | 250 | 255 |     |
| Gly | Leu | Asn | Asp | Phe | Arg | Thr | Ala | Gly | Gln | Trp | Val | Asn | Phe | Asn | Arg | 260 | 265 | 270 |     |
| Tyr | Arg | Arg | Glu | Met | Thr | Leu | Thr | Val | Leu | Asp | Ile | Ile | Ser | Met | Phe | 275 | 280 | 285 |     |
| Pro | Ile | Tyr | Asp | Ala | Arg | Leu | Tyr | Pro | Thr | Glu | Val | Lys | Thr | Glu | Leu | 290 | 295 | 300 |     |
| Thr | Arg | Glu | Ile | Tyr | Ser | Asp | Val | Ile | Asn | Gly | Glu | Ile | Tyr | Gly | Leu | 305 | 310 | 315 | 320 |
| Met | Thr | Pro | Tyr | Phe | Ser | Phe | Glu | Lys | Ala | Glu | Ser | Leu | Tyr | Thr | Arg | 325 | 330 | 335 |     |
| Ala | Pro | His | Leu | Phe | Thr | Trp | Leu | Lys | Gly | Phe | Arg | Phe | Val | Thr | Asn | 340 | 345 | 350 |     |
| Ser | Ile | Ser | Tyr | Trp | Thr | Phe | Leu | Ser | Gly | Gly | Gln | Asn | Lys | Tyr | Ser | 355 | 360 | 365 |     |
| Tyr | Thr | Asn | Asn | Ser | Ser | Ile | Asn | Glu | Gly | Ser | Phe | Arg | Gly | Gln | Asp | 370 | 375 | 380 |     |
| Thr | Asp | Tyr | Gly | Gly | Thr | Ser | Ser | Thr | Ile | Asn | Ile | Pro | Ser | Asn | Ser | 385 | 390 | 395 | 400 |
| Tyr | Val | Tyr | Asn | Leu | Trp | Thr | Glu | Asn | Tyr | Glu | Tyr | Ile | Tyr | Pro | Trp | 405 | 410 | 415 |     |
| Gly | Asp | Pro | Val | Asn | Ile | Thr | Lys | Met | Asn | Phe | Ser | Val | Thr | Asp | Asn | 420 | 425 | 430 |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Ser | Ser | Lys | Glu | Leu | Ile | Tyr | Gly | Ala | His | Arg | Thr | Asn | Lys | Pro |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Val | Val | Arg | Thr | Asp | Phe | Asp | Phe | Leu | Thr | Asn | Lys | Glu | Gly | Thr | Glu |
|     |     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |
| Leu | Ala | Lys | Tyr | Asn | Asp | Tyr | Asn | His | Ile | Leu | Ser | Tyr | Met | Leu | Ile |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Asn | Gly | Glu | Thr | Phe | Gly | Gln | Lys | Arg | His | Gly | Tyr | Ser | Phe | Ala | Phe |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Thr | His | Ser | Ser | Val | Asp | Pro | Asn | Asn | Thr | Ile | Ala | Ala | Asn | Lys | Ile |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Thr | Gln | Ile | Pro | Val | Val | Lys | Ala | Ser | Ser | Ile | Asn | Gly | Ser | Ile | Ser |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ile | Glu | Lys | Gly | Pro | Gly | Phe | Thr | Gly | Gly | Asp | Leu | Val | Lys | Met | Arg |
|     |     | 530 |     |     |     | 535 |     |     |     | 540 |     |     |     |     |     |
| Ala | Asp | Ser | Gly | Leu | Thr | Met | Arg | Phe | Lys | Ala | Glu | Leu | Leu | Asp | Lys |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Lys | Tyr | Arg | Val | Arg | Ile | Arg | Tyr | Lys | Cys | Asn | Tyr | Ser | Ser | Lys | Leu |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Ile | Leu | Arg | Lys | Trp | Lys | Gly | Glu | Gly | Tyr | Ile | Gln | Gln | Gln | Ile | His |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Asn | Ile | Ser | Pro | Thr | Tyr | Gly | Ala | Phe | Ser | Tyr | Leu | Glu | Ser | Phe | Thr |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Ile | Thr | Thr | Thr | Glu | Asn | Ile | Phe | Asp | Leu | Thr | Met | Glu | Val | Thr | Tyr |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Pro | Tyr | Gly | Arg | Gln | Phe | Val | Glu | Asp | Ile | Pro | Ser | Leu | Ile | Leu | Asp |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Lys | Ile | Glu | Phe | Leu | Pro | Thr | Asn |     |     |     |     |     |     |     |     |
|     |     |     |     |     | 645 |     |     |     |     |     |     |     |     |     |     |

<210> 14

<211> 682

<212> PRT

<213> *Bacillus thuringiensis*

<400> 14

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Ser | Tyr | Gln | Asn | Lys | Asn | Glu | Tyr | Glu | Ile | Leu | Asp | Ala | Lys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Arg | Asn | Thr | Cys | His | Met | Ser | Asn | Cys | Tyr | Pro | Lys | Tyr | Pro | Leu | Ala |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Asn | Asp | Pro | Gln | Met | Tyr | Leu | Arg | Asn | Thr | His | Tyr | Lys | Asp | Trp | Ile |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Asn | Met | Cys | Glu | Glu | Ala | Ser | Tyr | Ala | Ser | Ser | Gly | Pro | Ser | Gln | Leu |
|     |     | 50  |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Phe | Lys | Val | Gly | Gly | Ser | Ile | Val | Ala | Lys | Ile | Leu | Gly | Met | Ile | Pro |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Glu | Val | Gly | Pro | Leu | Leu | Ser | Trp | Met | Val | Ser | Leu | Phe | Trp | Pro | Thr |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Ile | Glu | Glu | Lys | Asn | Thr | Val | Trp | Glu | Asp | Met | Ile | Lys | Tyr | Val | Ala |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asn | Leu | Leu | Lys | Gln | Glu | Leu | Thr | Asn | Asp | Thr | Leu | Asn | Arg | Ala | Thr |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Ser | Asn | Leu | Ser | Gly | Leu | Asn | Glu | Ser | Leu | Asn | Ile | Tyr | Asn | Arg | Ala |
|     |     | 130 |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Leu | Ala | Ala | Trp | Lys | Gln | Asn | Lys | Asn | Asn | Phe | Ala | Ser | Gly | Glu | Leu |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Ile | Arg | Ser | Tyr | Ile | Asn | Asp | Leu | His | Ile | Leu | Phe | Thr | Arg | Asp | Ile |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Ser | Asp | Phe | Ser | Leu | Gly | Gly | Tyr | Glu | Thr | Val | Leu | Leu | Pro | Ser | 165 | 170 | 175 |
|     |     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |     |
| Tyr | Ala | Ser | Ala | Ala | Asn | Leu | His | Leu | Leu | Leu | Leu | Arg | Asp | Val | Ala |     |     |     |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |     |     |
| Ile | Tyr | Gly | Lys | Glu | Leu | Gly | Tyr | Pro | Ser | Thr | Asp | Val | Glu | Phe | Tyr |     |     |     |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |     |     |     |
| Tyr | Asn | Glu | Gln | Lys | Tyr | Tyr | Thr | Glu | Lys | Tyr | Ser | Asn | Tyr | Cys | Val |     |     |     |
|     | 225 |     |     |     | 230 |     |     |     |     |     | 235 |     |     |     | 240 |     |     |     |
| Asn | Thr | Tyr | Lys | Ser | Gly | Leu | Glu | Ser | Lys | Lys | Gln | Ile | Gly | Trp | Ser |     |     |     |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     |     | 255 |     |     |     |
| Asp | Phe | Asn | Arg | Tyr | Arg | Arg | Glu | Met | Thr | Leu | Ser | Val | Leu | Asp | Ile |     |     |     |
|     |     | 260 |     |     |     |     |     | 265 |     |     |     |     |     | 270 |     |     |     |     |
| Val | Ala | Leu | Phe | Pro | Leu | Tyr | Asp | Thr | Gly | Leu | Tyr | Pro | Ser | Lys | Asp |     |     |     |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     |     |     | 285 |     |     |     |     |
| Gly | Lys | Ile | His | Val | Lys | Ala | Glu | Leu | Thr | Arg | Glu | Ile | Tyr | Ser | Asp |     |     |     |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |     |     |     |
| Val | Ile | Asn | Asp | His | Val | Tyr | Gly | Leu | Met | Val | Pro | Tyr | Ile | Ser | Phe |     |     |     |
|     | 305 |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |     |     |     |
| Glu | His | Ala | Glu | Ser | Leu | Tyr | Thr | Arg | Arg | Pro | His | Ala | Phe | Thr | Trp |     |     |     |
|     |     |     | 325 |     |     |     |     | 330 |     |     |     |     |     | 335 |     |     |     |     |
| Leu | Lys | Gly | Phe | Arg | Phe | Val | Thr | Asn | Ser | Ile | Asn | Ser | Trp | Thr | Phe |     |     |     |
|     |     | 340 |     |     |     |     | 345 |     |     |     |     |     | 350 |     |     |     |     |     |
| Leu | Ser | Gly | Gly | Glu | Asn | Arg | Tyr | Phe | Leu | Thr | His | Gly | Glu | Gly | Thr |     |     |     |
|     | 355 |     |     |     |     | 360 |     |     |     |     |     | 365 |     |     |     |     |     |     |
| Ile | Tyr | Asn | Gly | Pro | Phe | Leu | Gly | Gln | Asp | Thr | Glu | Tyr | Gly | Gly | Thr |     |     |     |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |     |     |     |
| Ser | Ser | Tyr | Ile | Asp | Ile | Ser | Asn | Asn | Ser | Ser | Ile | Tyr | Asn | Leu | Trp |     |     |     |
|     | 385 |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |     |     |     |
| Thr | Lys | Asn | Tyr | Glu | Trp | Ile | Tyr | Pro | Trp | Thr | Asp | Pro | Val | Asn | Ile |     |     |     |
|     |     |     | 405 |     |     |     |     |     | 410 |     |     |     |     | 415 |     |     |     |     |
| Thr | Lys | Ile | Asn | Phe | Ser | Ile | Thr | Asp | Asn | Ser | Asn | Ser | Ser | Glu | Ser |     |     |     |
|     |     | 420 |     |     |     |     |     | 425 |     |     |     |     | 430 |     |     |     |     |     |
| Ile | Tyr | Gly | Ala | Glu | Arg | Met | Asn | Lys | Pro | Thr | Val | Arg | Thr | Asp | Phe |     |     |     |
|     | 435 |     |     |     |     | 440 |     |     |     |     |     | 445 |     |     |     |     |     |     |
| Asn | Phe | Leu | Leu | Asn | Arg | Ala | Gly | Asn | Gly | Pro | Thr | Thr | Tyr | Asn | Asp |     |     |     |
|     | 450 |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |     |     |     |     |
| Tyr | Asn | His | Ile | Leu | Ser | Tyr | Met | Leu | Ile | Asn | Gly | Glu | Thr | Phe | Gly |     |     |     |
|     | 465 |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |     |     |     |
| Gln | Lys | Arg | His | Gly | Tyr | Ser | Phe | Ala | Phe | Thr | His | Ser | Ser | Val | Asp |     |     |     |
|     |     |     | 485 |     |     |     |     | 490 |     |     |     |     |     | 495 |     |     |     |     |
| Arg | Tyr | Asn | Thr | Ile | Val | Pro | Asp | Lys | Ile | Val | Gln | Ile | Pro | Ala | Val |     |     |     |
|     |     | 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |     |     |     |
| Lys | Thr | Asn | Leu | Val | Gly | Ala | Asn | Ile | Ile | Lys | Gly | Pro | Gly | His | Thr |     |     |     |
|     | 515 |     |     |     |     | 520 |     |     |     |     |     | 525 |     |     |     |     |     |     |
| Gly | Gly | Asp | Leu | Leu | Lys | Leu | Glu | Tyr | Glu | Arg | Phe | Leu | Ser | Leu | Arg |     |     |     |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |     |     |     |
| Ile | Lys | Leu | Ile | Ala | Ser | Met | Thr | Phe | Arg | Ile | Arg | Ile | Arg | Tyr | Ala |     |     |     |
|     | 545 |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |     |     |     |
| Ser | Asn | Ile | Ser | Gly | Gln | Met | Met | Ile | Asn | Ile | Gly | Tyr | Gln | Asn | Pro |     |     |     |
|     |     |     | 565 |     |     |     |     | 570 |     |     |     |     |     | 575 |     |     |     |     |
| Thr | Tyr | Phe | Asn | Ile | Ile | Pro | Thr | Thr | Ser | Arg | Asp | Tyr | Thr | Glu | Leu |     |     |     |
|     |     | 580 |     |     |     |     |     | 585 |     |     |     |     |     | 590 |     |     |     |     |
| Lys | Phe | Glu | Asp | Phe | Gln | Leu | Val | Asp | Thr | Ser | Tyr | Ile | Tyr | Ser | Gly |     |     |     |
|     | 595 |     |     |     |     | 600 |     |     |     |     |     | 605 |     |     |     |     |     |     |
| Gly | Pro | Ser | Ile | Ser | Ser | Asn | Thr | Leu | Trp | Leu | Asp | Asn | Phe | Ser | Asn |     |     |     |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |     |     |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Pro | Val | Ile | Ile | Asp | Lys | Ile | Glu | Phe | Ile | Pro | Leu | Gly | Ile | Thr |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Leu | Asn | Gln | Ala | Gln | Gly | Tyr | Asp | Thr | Tyr | Asp | Gln | Asn | Ala | Asn | Gly |
|     |     |     |     | 645 |     |     |     |     |     | 650 |     |     |     |     | 655 |
| Met | Tyr | His | Gln | Asn | Tyr | Ser | Asn | Ser | Gly | Tyr | Asn | Tyr | Asn | Gln | Glu |
|     |     |     | 660 |     |     |     |     |     | 665 |     |     |     |     | 670 |     |
| Tyr | Asn | Thr | Tyr | Tyr | Gln | Ser | Tyr | Asn | Asn |     |     |     |     |     |     |
|     |     | 675 |     |     |     |     |     | 680 |     |     |     |     |     |     |     |

<210> 15

<211> 674

<212> PRT

<213> Bacillus thuringiensis

<400> 15

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Gln | Tyr | Gln | Asn | Lys | Asn | Glu | Tyr | Glu | Ile | Leu | Glu | Ser | Ser |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Gln | Asn | Asn | Met | Asn | Met | Pro | Asn | Arg | Tyr | Pro | Phe | Ala | Asp | Asp | Pro |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Asn | Ala | Val | Met | Lys | Asn | Gly | Asn | Tyr | Lys | Asp | Trp | Val | Asn | Glu | Cys |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Glu | Gly | Ser | Asn | Ile | Ser | Pro | Ser | Pro | Ala | Ala | Ala | Ile | Thr | Ser | Lys |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Ile | Val | Ser | Ile | Val | Leu | Lys | Thr | Leu | Ala | Lys | Ala | Val | Ala | Ser | Ser |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |
| Leu | Ala | Asp | Ser | Ile | Lys | Ser | Ser | Leu | Gly | Ile | Ser | Lys | Thr | Ile | Thr |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Glu | Asn | Asn | Val | Ser | Gln | Val | Ser | Met | Val | Gln | Val | His | Gln | Ile | Ile |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asn | Arg | Arg | Ile | Gln | Glu | Thr | Ile | Leu | Asp | Leu | Gly | Glu | Ser | Ser | Leu |
|     |     |     | 115 |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Asn | Gly | Leu | Val | Ala | Ile | Tyr | Asn | Arg | Asp | Tyr | Leu | Gly | Ala | Leu | Glu |
|     | 130 |     |     |     |     |     | 135 |     |     |     | 140 |     |     |     |     |
| Ala | Trp | Asn | Asn | Asn | Lys | Ser | Asn | Ile | Asn | Tyr | Gln | Thr | Asn | Val | Ala |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Glu | Ala | Phe | Lys | Thr | Val | Glu | Arg | Glu | Phe | Phe | Thr | Lys | Leu | Lys | Gly |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Ile | Tyr | Arg | Thr | Ser | Ser | Ser | Gln | Ile | Thr | Leu | Leu | Pro | Thr | Phe | Thr |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Gln | Ala | Ala | Asn | Leu | His | Leu | Ser | Met | Leu | Arg | Asp | Ala | Val | Met | Tyr |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Gln | Glu | Gly | Trp | Asn | Leu | Gln | Ser | His | Ile | Asn | Tyr | Ser | Lys | Glu | Leu |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Asp | Asp | Ala | Leu | Glu | Asp | Tyr | Thr | Asn | Tyr | Cys | Val | Glu | Val | Tyr | Thr |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Lys | Gly | Leu | Asn | Ala | Leu | Arg | Gly | Ser | Thr | Ala | Ile | Asp | Trp | Leu | Glu |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Phe | Asn | Ser | Phe | Arg | Arg | Asp | Met | Thr | Leu | Met | Val | Leu | Asp | Leu | Val |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Ala | Ile | Phe | Pro | Asn | Tyr | Asn | Pro | Val | Arg | Tyr | Pro | Leu | Ser | Thr | Lys |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Ile | Ser | Leu | Ser | Arg | Lys | Ile | Tyr | Thr | Asp | Pro | Val | Gly | Arg | Thr | Asp |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Ser | Pro | Ser | Phe | Gly | Asp | Trp | Thr | Asn | Thr | Gly | Arg | Thr | Leu | Ala | Asn |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     | 320 |     |
| Phe | Asn | Asp | Leu | Glu | Arg | Glu | Val | Thr | Asp | Ser | Pro | Ser | Leu | Val | Lys |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Trp | Leu | Gly | Asp | Met | Thr | Ile | Tyr | Thr | Gly | Ala | Ile | Asp | Ser | Tyr | Arg | 325 | 330 | 335 |
|     |     |     | 340 |     |     |     |     |     | 345 |     |     |     | 350 |     |     |     |     |     |
| Pro | Thr | Ser | Pro | Gly | Asp | Arg | Ile | Gly | Val | Trp | Tyr | Gly | Asn | Ile | Asn |     |     |     |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |     |     |     |
| Ala | Phe | Tyr | His | Thr | Gly | Arg | Thr | Asp | Val | Val | Met | Phe | Arg | Gln | Thr |     |     |     |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |     |     |     |
| Gly | Asp | Thr | Ala | Tyr | Glu | Asp | Pro | Ser | Thr | Phe | Ile | Ser | Asn | Ile | Leu |     |     |     |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     | 400 |     |     |     |     |
| Tyr | Asp | Asp | Ile | Tyr | Lys | Leu | Asp | Leu | Arg | Ala | Ala | Ala | Val | Ser | Thr |     |     |     |
|     |     |     | 405 |     |     |     |     |     | 410 |     |     |     |     | 415 |     |     |     |     |
| Ile | Gln | Gly | Ala | Met | Asp | Thr | Thr | Phe | Gly | Val | Ser | Ser | Ser | Arg | Phe |     |     |     |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |     |     |     |
| Phe | Asp | Ile | Arg | Gly | Arg | Asn | Gln | Leu | Tyr | Gln | Ser | Asn | Lys | Pro | Tyr |     |     |     |
|     |     | 435 |     |     |     | 440 |     |     |     |     |     | 445 |     |     |     |     |     |     |
| Pro | Ser | Leu | Pro | Ile | Thr | Ile | Thr | Phe | Pro | Gly | Glu | Glu | Ser | Ser | Glu |     |     |     |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |     |     |     |
| Gly | Asn | Ala | Asn | Asp | Tyr | Ser | His | Leu | Leu | Cys | Asp | Val | Lys | Ile | Leu |     |     |     |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     | 480 |     |     |     |     |
| Gln | Glu | Asp | Ser | Ser | Asn | Ile | Cys | Glu | Gly | Arg | Ser | Ser | Leu | Leu | Ser |     |     |     |
|     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |     |     |     |     |
| His | Ala | Trp | Thr | His | Ala | Ser | Leu | Asp | Arg | Asn | Asn | Thr | Ile | Leu | Pro |     |     |     |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     | 510 |     |     |     |     |     |     |
| Asp | Glu | Ile | Thr | Gln | Ile | Pro | Ala | Val | Thr | Ala | Tyr | Glu | Leu | Arg | Gly |     |     |     |
|     |     | 515 |     |     |     | 520 |     |     |     |     |     | 525 |     |     |     |     |     |     |
| Asn | Ser | Ser | Val | Val | Ala | Gly | Pro | Gly | Ser | Thr | Gly | Gly | Asp | Leu | Val |     |     |     |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |     |     |     |
| Lys | Met | Ser | Tyr | His | Ser | Val | Trp | Ser | Phe | Lys | Val | Tyr | Cys | Ser | Glu |     |     |     |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     | 560 |     |     |     |     |
| Leu | Lys | Asn | Tyr | Arg | Val | Arg | Ile | Arg | Tyr | Ala | Ser | His | Gly | Asn | Cys |     |     |     |
|     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |     |     |     |     |
| Gln | Phe | Leu | Met | Lys | Arg | Trp | Pro | Ser | Thr | Gly | Val | Ala | Pro | Arg | Gln |     |     |     |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |     |     |     |
| Trp | Ala | Arg | His | Asn | Val | Gln | Gly | Thr | Phe | Ser | Asn | Ser | Met | Arg | Tyr |     |     |     |
|     |     | 595 |     |     |     | 600 |     |     |     |     |     | 605 |     |     |     |     |     |     |
| Glu | Ala | Phe | Lys | Tyr | Leu | Asp | Ile | Phe | Thr | Ile | Thr | Pro | Glu | Glu | Asn |     |     |     |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |     |     |     |
| Asn | Phe | Ala | Phe | Thr | Ile | Asp | Leu | Glu | Ser | Gly | Gly | Asp | Leu | Phe | Ile |     |     |     |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     | 640 |     |     |     |     |
| Asp | Lys | Ile | Glu | Phe | Ile | Pro | Val | Ser | Gly | Ser | Ala | Phe | Glu | Tyr | Glu |     |     |     |
|     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |     |     |     |     |
| Gly | Lys | Gln | Asn | Ile | Glu | Lys | Thr | Gln | Lys | Ala | Val | Asn | Asp | Leu | Phe |     |     |     |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |     |     |     |
| Ile | Asn |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |